FRANKLIN COMPUTER CORPORATION
7030 COLONIAL HIGHWAY
PENNSAUKEN, N.J. 08109
609 488-1700

DEALER SERVICE TRAINING

INTRODUCTION

The Authorized Service Center Training Course is designed to provide the service technician with the proper training to allow him to diagnose and repair most of the problems he is likely to encounter on a day to day basis.

The training course relies heavily on hands on experience in a real life working situation. This experience is supported by lectures and question/answer periods as necessary.

The course is currently one day in length. The schedule for the course is as follows:

COURSE SCHEDULE

9:00 - 10:30	WELCOME ORIENTATION, FRANKLIN ORGANIZATION, COURSE DESCRIPTION
10:30 - 12:00	WORK STATION ASSIGNMENTS
12:00	LUNCH
1:00 - 2:00	WARRANTY PROGRAM, POLICIES AND PROCEDURES
2:00 - 5:00	WORK STATION ASSIGNMENTS

Most of the work station assignments are self explanatory and can be performed in any order. Exceptions will be noted by the course instructor in the orientation period . The work station assignments can be found in the second area of your Dealer Service Manual. A list of the assignments is as follows:

SECTION 1 - COMPONENTS

SECTION 2 - MOTHERBOARD LAYOUT

SECTION 3 - ACE 100 COMPUTER DISASSEMBLY AND ASSEMBLY

SECTION 4 - ACE 1000 COMPUTER DISASSEMBLY AND ASSEMBLY

SECTION 5 - DISK 1 (MECHANICAL)

SECTION 6 - DISK 2 (TESTS AND ADJUSTMENTS)
(OPTIONAL ALIGNMENTS)

SECTION 7 - OPERATING SYSTEM

SECTION 8 - DIAGNOSTICS

SECTION 9 - TROUBLESHOOTING

SECTION 10 - WARRANTY

SECTION 11 - DEFECTIVE MATERIAL TAG

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SECTION 1

OVERVIEW

This module covers the basic skills involved in handling and identifying components within the ACE 100/1000.

EQUIPMENT NECESSARY

1. One ACE motherboard

2. One I.C. puller

3. One layout sheet

PREREQUISITES

None

ORIENTATION

There are 3 major items to consider when working with the ACE computer motherboard. They are:

1. TURN THE POWER OFF.

2. Static electricity

3. I.C. pinout

POWER OFF

One of the most common problems encountered in working on computers is the "zapping" of plug in modules and cards by removing or installing them while the power is turned on.

The actual mechanics of why it happens is most likely beyone the scope of this orientation, but generally a quick explanation is shorting of pins, voltage spikes on BUSS lines, or grounding of voltages. Regardless, the result is nearly always the same - a blown I.C. or two with the possibility of damaging the entire motherboard.

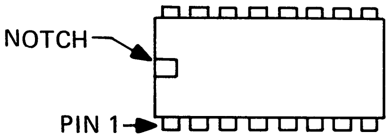
Step 1 in looking at the components inside the ACE 100/1000 is TURN OFF THE POWER.

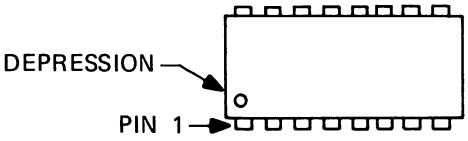
STATIC ELECTRICITY

Static electricity is generally more prevalent in the winter months, but it is reason for concern even in the summer. Everyone has had fun by dragging their feet across a rug or carpet so they could shock someone with a big spark. Well those sparks are a very high voltage and are enough to damage some components in a computer. Care must be taken to "discharge" yourself prior to touching any of the parts on the motherboard. The best thing to do is to touch a large, grounded metal surface (such as the power supply case) before you start to handle the actual components.

I.C. PINOUTS

The usual mishap with IC's is either putting them in backwards or accidentally bending a pin under the case as you insert it into the socket. First lets look at the method of identifying the pins. Notice in the views below that not all IC's have the same type of indicator for pin one. Some will have the notch, some will have the depression. Whichever way is used to mark pin one, this location is important when you insert an IC into a circuit.





Normally, an electronic board has all the vertical and horizontal IC's installed the same way. If you do forget how you got it out, look at the other IC's in that area of the board. Putting a chip in backward not only leads to a non functioning computer, but provides a good opportunity for the IC to burn up.

To remove a chip, the IC puller (provided in your service kit) is placed under the chip on each open end. With gentle pressure and a slight rocking motion, pull the IC up and out of the socket. If too much force is used, you may bend the leads as you pull the IC from the socket.

Replacing a previously installed IC is fairly easy because the pins have been "sized" or shaped to the socket. A new chip will have it's pins somewhat non-aligned with the socket structure, so once again, care is required to be sure that all pins are inserted and seated properly. The best way is to partially insert one side and exert enough pressure sideways to line up the other side of pins. This is the time that bending is so easily done. Take the time to check the seating of all the pins after the IC is inserted completely.

EXERCISE

1. Pull several IC's from the motherboard. Select several different sizes.

2. Identify the pins and replace the IC's, each in it's proper location.

3. Demonstrate your proficiency to the course instructor.

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SECTION 2

OVERVIEW

This section provides an orientation and familiarization with the physical motherboard, defining the various parts. Along with the ability to recognize the board layout, you should also be able to identify misplaced IC's and possibly other board problems. As you are repairing ACE equipment, you will have to contend with the possibility that the customer has induced problems in the hardware by attempting to repair it himself.

PREREQUISITES

Section 1 of the training exercises.

EQUIPMENT NECESSARY

1. One ACE 100/1000 motherboard
2. One motherboard layout sheet
3. One IC puller

ORIENTATION

The ACE 100 motherboard components can be referenced by the vertical letters and horizontal numbers. For example, look at row C and column 3 -- at the intersection of those lines is a 4116 RAM IC. In fact, points C3 through C10 are all RAM memory chips. This is how areas are referenced on the board and how IC's are pinpointed. Lets look at the board in total.

Rows J, K, and L comprise, for the most part, the input/output slots. They are also numbered 0 thru 7 for reference. We will discuss them more when we talk about peripherals.

Notice the empty socket at J-14. This is the game paddle I/O socket. This is important not just for games. Some business programs use this location for input or security purposes. As we move around the board, you will notice how easy it is to locate each chip and identify the board parts.

For a rough idea of how the circuitry is laid out, we can identify the function of some of the chips:

1. Row A is mostly keyboard and video circuitry. Notice the large IC at location A6. That is the character generator.
2. Row B is again mostly keyboard and video circuitry.
3. Rows C, D, and E house mainly the RAM memory chips with some additional circuitry on either side.
4. Row G is the ROM memory area. ROM, of course, has the resident BASIC language and the monitor.

5. In row H we have the heart of the computer - the CPU or processor (the 6502 chip in location H7-8). The supporting curcuits are also in this row.

This now gives us an idea of how the board is laid out and shows that each location is a specified spot for a particular IC. Do not dismiss the fact that some enterprising repair minded customer may try swapping IC's and misplace a few! Even if they are in the right location, they could be in backwards or the pins could be bent under or broken.

The following excercise will provide some practice in identifying some of these possible problems.

EXERCISE

1. Visually check the motherboard to be sure of pin seating and alignment.

2. Assure the proper orientation of each IC (in backwards?).

3. Check the IC type with the indicated socket label.

4. Place an X on any problem chips you find on your layout sheet. Present the layout sheet to the course instructor when you are finished.

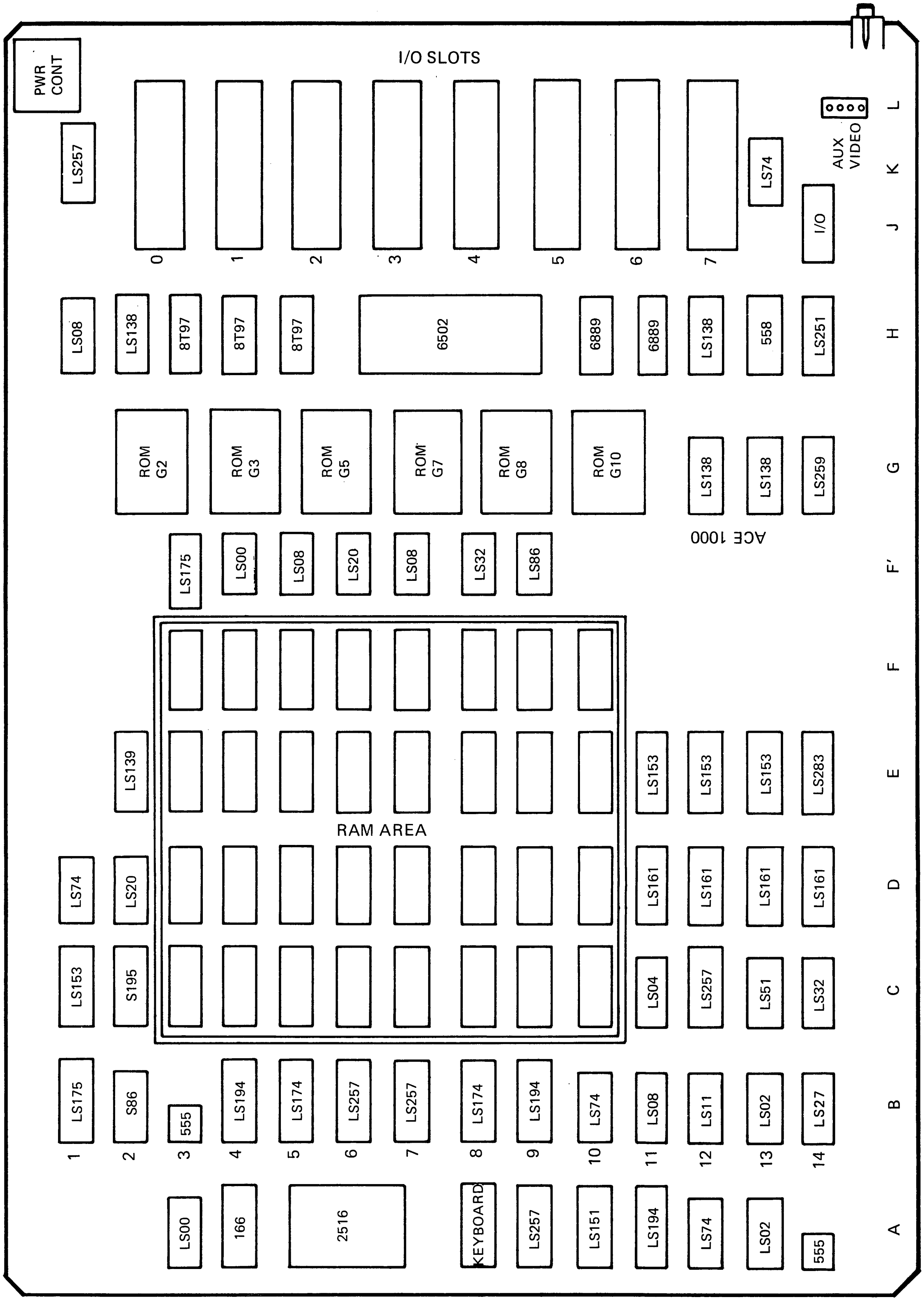

Figure 1. ACE 1000 Mother Board

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SECTION 3

OVERVIEW

This section covers the familiarization and basic skills necessary to completely disassemble and reassemble the ACE1000 computer.

PREREQUISITES

None

EQUIPMENT NECESSARY

1. One ACE 1000 computer

2. One phillips head screw driver

EXERCISE

Follow the exercise plan step by step. Demonstrate your proficiency to the course instructor in this exercise at the end of the disassembly and the reassembly procedures.

SECTION 3 - COMPUTER DISASSEMBLY AND REASSEMBLY

UNIT 1 - DISASSEMBLY

PREPARATION

1. Unplug the computer from the A.C. line and remove the power cable from the rear of the unit at the power supply.

2. Separate the lid from the lower portion of the unit by removing the five screws as shown in figure

3. Remove any peripheral cards installed in the computer.

4. Remove the 16k RAM card from slot 0 and carefully unplug the connecting cable from the motherboard. Leave the cable attached to the RAM card. Press a piece of rigid foam over the end of the cable connector to prevent damage.

5. The computer is now ready for the removal of the remaining modules.

KEYBOARD SWITCH ELEMENT

1. Select any key for removal of a key element. Remove the key cap with the cap removal tool. Lift the cap straight up to avoid any damage to the keyboard or cap. See figure

2. Lift the compression spring from the key element.

3. Using the tool provided, punch through the plastic on the left and right sides of the key element. While pushing downward on the tool, squeeze the tool together and lift the key element from the keyboard. See figure

KEYBOARD

1. Tilt the keyboard forward to expose the motherboard.

2. Unplug the keyboard interface cable from the motherboard and lift the keyboard away from the main computer unit.

3. Place the keyboard assembly on the foam pad provided with the key tops facing the foam.

4. Separate the keyboard from the keyboard plate by removing the four screws as shown in figure

5. Disconnect the keyboard cable assembly from the unit by unplugging the connectors at the RESET/LED assembly and the keyboard unit.

RESET/L.E.D. ASSEMBLY

1. Remove the two retaining screws as shown in figure
2. Lift the assembly clear of the mounting plate.

MOTHERBOARD

1. Squeeze the sides of the D.C. power plug at the rear left of the motherboard and lift upward to unseat the plug.
2. Unplug the speaker connector.
3. Remove the 9 retaining screws as shown in figure and carefully lift the motherboard free from the base.

POWER SUPPLY

1. Turn the computer base over and place it on the foam pad provided.
2. Remove the four retaining screws holding the power supply to the base and lift the base.

UNIT 2 - REASSEMBLY

POWER SUPPLY

1. Attach the power supply to the left rear area of the base with four retaining screws.

MOTHERBOARD

1. Carefully place the motherboard in the base with the video connector to the right rear of the cabinet. Line up the screw holes with the 9 standoffs in the base.
2. Install and tighten the 9 retaining screws.
3. Plug in the speaker connector.
4. Plug in the power supply connector.

RESET/L.E.D. ASSEMBLY

1. Invert the keyboard plate onto a foam pad.
2. Attach the RESET/L.E.D. assembly to the plate with two screws as shown in figure

KEYBOARD

1. Invert the keyboard plate onto a foam pad.
2. Place the keyboard over the plate, aligning the mounting points at the left and right sides of the keyboard.
3. Loosely insert the four mounting screws.
4. Connect the RESET/L.E.D. connector in the keyboard harness to the RESET/L.E.D. unit. Be sure to connect pin 1 on the plug to pin 1 on the P.C. card.
5. Tighten the four keyboard mounting screws.
6. Attach the keyboard interface card and connector to the keyboard.
7. Rest the keyboard and mounting plate unit on the front edge of the computer base. Plug the keyboard interface cable into the motherboard at location A6. Be sure the cable orientation is from left to right as shown in figure

8. Seat the plate assembly into position in the base unit.

KEY ELEMENT

1. Insert a new key element into the keyboard. Press firmly until the new element clicks into place.

2. Place the compression spring over the key element. Firmly press the key cap over the element and spring until the cap snaps into place.

FINAL ASSEMBLY

1. Install the 16K RAM card in slot 0.

2. Connect the RAM card interface cable to the motherboard at location . Be very careful to orient the cable so that the forward edge of the cable at the RAM card is also facing froward when plugged into the motherboard. See figure .

3. Install any necessary peripheral cards into the proper slots.

4. Place the lid on the computer and secure with five screws as shown in figure .

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SECTION 4

OVERVIEW

This section covers the familiarization and basic skills necessary to completely disassemble and reassemble the ACE 100 computer.

PREREQUISITES

None

EQUIPMENT NECESSARY

1. One ACE 100 computer

2. One phillips head screw driver

EXERCISE

Follow the exercise plan step by step. Demonstrate your proficiency to the course instructor in this exercise at the end of the disassembly and the reassembly procedures.

SECTION 4 - COMPUTER DISASSEMBLY AND REASSEMBLY - ACE 1000

UNIT 1 - DISASSEMBLY

PREPARATION

1. Unplug the computer from the A.C. line and remove the power cable from the rear of the unit at the power supply.

2. Separate the lid from the lower portion of the unit by pushing the retaining latches at the top rear of the cover toward the rear of the computer and lifting the top.

3. Remove any peripheral cards installed in the computer.

4. The computer is now ready for the removal of the remaining modules.

KEYBOARD SWITCH ELEMENT

1. Select any key for removal of a key element. Remove the key cap with the cap removal tool. Lift the cap straight up to avoid any damage to the keyboard or cap. See figure

2. Lift the compression spring from the key element.

3. Using the tool provided, punch through the plastic on the left and right sides of the key element. While pushing downward on the tool, squeeze the tool together and lift the key element from the keyboard. See figure

CASE REMOVAL

1. Turn the computer over so that the metal bottom plate is facing up.

2. Remove the twelve screws along the outer perimeter of the metal bottom plate (three on each side).

3. Holding the top and bottom of the case together, turn the case upright again.

4. Lift the case slightly and move it forward enough to reach the keyboard cable at the motherboard. Unplug the cable.

KEYBOARD

1. Turn the case over on it's top to get access to the keyboard.

2. Remove the four retaining screws holding the keyboard to the

top and lift the keyboard away from the top.

5. Disconnect any cables still attached to the keyboard and set the keyboard aside.

MOTHERBOARD

1. Squeeze the sides of the D.C. power plug at the rear left of the motherboard and lift upward to unseat the plug.
2. Unplug the speaker connector.
3. Remove the 9 retaining screws as shown in figure and carefully lift the motherboard free from the base.

POWER SUPPLY

1. Turn the computer base over and place it on the foam pad provided.
2. Remove the four retaining screws holding the power supply to the base and lift the base.

UNIT 2 - REASSEMBLY

POWER SUPPLY

1. Attach the power supply to the left rear area of the base with four retaining screws.

MOTHERBOARD

1. Carefully place the motherboard in the base with the video connector to the right rear of the cabinet. Line up the screw holes with the 9 standoffs in the base.
2. Install and tighten the 9 retaining screws.
3. Plug in the speaker connector.
4. Plug in the power supply connector.

KEYBOARD

1. Invert the computer case onto a foam pad.
2. Place the keyboard into the base, aligning the mounting points at the left and right sides of the keyboard.
3. Loosely insert the four mounting screws.
4. Connect the cables to the keyboard. Be sure to connect pin 1 on the plug to pin 1 on the P.C. card.
5. Tighten the four keyboard mounting screws.
6. Attach the keyboard interface card and connector to the keyboard.
7. Lower the computer case over the base enough to plug the keyboard cable into the motherboard at location A6. Be careful to properly orient the cable as you plug it in.
8. Seat the cover onto the base. Holding the two together, turn over the computer. Insert the 12 screws at the perimeter of the base and tighten them.

KEY ELEMENT

1. Insert a new key element into the keyboard. Press firmly until the new element clicks into place.
2. Place the compression spring over the key element. Firmly

press the key cap over the element and spring until the cap snaps into place.

FINAL ASSEMBLY

1. Install any necessary peripheral cards into the proper slots in the computer.
2. Place the lid on the computer and press at the rear until the lid latches in place.

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SECTION 5

OVERVIEW

This section will provide the information necessary to allow you to disassemble and reassemble the floppy disk drives along with the knowledge needed to replace cables, guides, and components.

PREREQUISITES

Complete Section 1

EQUIPMENT NECESSARY

1. Disk drive with analog card installed

2. Phillips screw driver

3. Common screw driver

4. Allen wrench

ORIENTATION

Remember that the disk drive must be disconnected from the ACE computer for this exercise. Be sure to TURN THE POWER OFF prior to removing the contrller card. Remove the card and detach the disk drive cables.

Once the drive is detached, locate and remove the 2 phillips screws on each side of the cover. Lift the cover up and set it aside.

Visually inspect the interior - especially notice the cables and connectors. The large black connector at the rear contains the control lines such as write protect, motor on/off, and D.C. voltages. The smaller connector to the right rear is for the interface to the ACE computer. This carries the data and control signals to and from the computer. The round black device which the cable passes through (if installed) is to supress RFI interference. The four pin connector on the front of the analog card contains the read/write lines for the head. Along the left side (viewed from the front) you will see a small switch and lever arm. This is the write protect switch which allows a diskette to be written on if the switch is fully up. If the notch in the side of the diskette is covered, the lever is blocked and will not allow the diskette to be written to.

A good orientation of the disk drive now will let you see how it SHOULD work! Slowly close the disk drive door. Notice the round hub in the center seat itself in it's retainer. Put a diskette in. Notice how the plastic stop guide toward the rear limits the distance the diskette goes in. Close the door and notice how the hub will center the diskette as it engages.

Now that we have seen some of the functions, lets disassemble and reassemble the disk drive.

EXERCISE

1. Remove the connectors on the analog board (there are three of them) taking care to not damage the wiring. Use particular care with the head cable. Remove the 2 phillips screws at the front of the analog card and slide it forward out of the guides. Set the analog card aside.

2. Lift the head load arm and look at the pad underneath. Using the needle nose pliers, squeeze the two tabs on top of the button and gently push the load pad down and out. Set the load pad aside.

3. Using the allen wrench, loosen the 2 screws holding the write protect switch. Adjust the lever arm so that it's tip is extended even with the top of the guide rail. Retighten the allen screws just enough to hold the switch steady. This is a coarse adjustment to get the lever in the proper range. Insert a diskette slowly and listen for a click of the switch as the diskette passes over the lever. A click should be heard as the lever goes down under the diskette, and another click should be heard as the lever reappears in the notch of the diskette. Adjust the switch as necessary to give the proper response. When positioned properly, tighten the allen screws.

4. Lift the load arm and insert the load pad in from the underside. Snap the pad into it's position and release the load arm.

5. Position the head read/write connector to the outside of the guide rails and slide the analog board back into position. Align the screw holes with the threaded inserts and replace the mounting screws.

6. Reattach the cables in the following manner:

    a. Notice the pin/hole alignment of the head read/write connector. Align the holes and re-insert the connector.

    b. Attach the large connector to the middle of the board and, observing the plastic latches, seat in the retaining holes.

    c. Position the controller cable so that the cable exits the connector at a right angle upward and plug the connector onto the pins. The cable should exit the connector straight up, go through the torroid ring, and out the rear of the drive.

7. Do a visual check to be sure that all cables are attached and the card is secure.

8. Before replacing the cover, connect the drive to an ACE computer and verify proper operation with the course instructor.

9. Replace the disk drive cover.

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SECTION 6

OVERVIEW

This module provides the dealer with the knowledge and practice to properly service and align the ACE 10 floppy disk subsystem.

The service technician should perform all of the tests indicated even though his own service center may not have the use of an oscilloscope. This will familiarize the technician with the proper procedures should his service center acquire a scope at a later date.

PREREQUISITES

NONE

EQUIPMENT NECESSARY

1. ACE computer with floppy disk subsystem
2. One oscilloscope with two test probes
3. One alignment diskette
4. One MECHANICS TEST diskette
5. Dealer service manual

EXERCISE

Use Bulletin DSK-002 of this manual and perform all of the tests and alignments indicated. At the completion of each test, demonstrate your results to the instructor.

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SECTION 7

OVERVIEW

This section will familiarize the service technician with the basic utilities and functions on the Master Systems Diskette.

PREREQUISITES

NONE

EQUIPMENT NECESSARY

1. ACE computer with floppy disk subsystem

2. ACE 1000 User Manual

3. ACE 1000 Master Diskette

4. Blank diskette

4. Dealer service manual

EXERCISE

1. Apply power to the computer and boot on the Master Systems Diskette.

2. Load the "HELLO" program into memory. List the contents of the program on the monitor. Initialize a new diskette with the "HELLO" program only. Test the diskette to be sure it boots in the system properly. Erase the hello program from memory and create your own short "HELLO" program. Initialize the blank diskette with the program and test it to see the results on boot up.

3. Copy your Master Diskette to your scratch diskette using only a single disk drive.

4. Copy your Master Diskette to your scratch diskette using two disk drives.

5. Load the FUD program and exercise each of the selections indicated.

6. Write a short BASIC program to display anything on the monitor and save the program on the scratch diskette.

Refer to the appropriate section of the ACE 1000 Users Manual for all of the above tests.

Demonstrate the results of each test to your instructor.

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SECTION 8

OVERVIEW

This section and exercise will instruct the technician in the proper use of the diagnostics programs provided to the Authorized Service Center. These diagnostics will allow the technician to pinpoint and repair most of the problems normally encountered with the ACE equipment.

PREREQUISITES

Complete Sections 1 and 2

EQUIPMENT REQUIRED

1. ACE 100 Computer with disk drive subsystem

2. Diagnostic diskette

EXERCISE

Thoroughly read Section 9, ACE 100 diagnostics, of the Dealer Service Manual.

Practice loading and executing each of the diagnostics listed in the manual.

Demonstrate your proficiency in executing the diagnostics to the course instructor.

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SECTION 9

OVERVIEW

This section is designed to show the service technician the best methods to use in diagnosis and repair of the Franklin ACE equipment. The exercise portion of this section will give the technician practice in the diagnosis and repair of typical problems he is likely to encounter in servicing this equipment.

PREREQUISITES

Complete Sections 1, 2, 3, and 8

EQUIPMENT NECESSARY

1. ACE 100 with disk drive subsystem
2. Digital voltmeter
3. Phillips screw driver
4. Common screw driver
5. Diagnostic Diskette

ORIENTATION

Concept:
1. Identify the problem
2. Locate the faulty area
3. Replace the module to get the customer up as soon as possible

Field Service is a study in Psychology in itself. You are constantly having to make something good out of something bad, and it has to be done "IMMEDIATELY". With this in mind, we have to consider that no matter how technically competent you may be, the customer is more impressed (and grateful) for minimum downtime and maximum usability. After he has his system, the more he sees you socially and less professionally, the better influence he will be on new customer referrals. So, that leads us to the character of our relationship with customers.

When a "down system" is presented to you, there is a huge gap between problem and solution. Step number 1 is information! Of course, the more aware your customer is, the better off you are. But considering that he just says "it broke", you have to gather enough information about the situation to determine a pattern or probable area. For this reason, we feel that knowledge about the main functions of the ACE computer will allow you to isolate the problem to a possible faulty area. So, step number 1 is to identify the problem area with pertinent information so that you can develope a possible cause for the fault.

Once the probable defective area is determined, the problem can be eliminated by exchanging related modules. For example, if the problem is no video and the ACE has been verified as having good output, and the video monitor is tested and good, the item to change is the video cable. This seems like a menial problem, but the logical approach is the same as would be used on a more difficult problem. So, step number 2 is to approach the problem area with the idea of exchanging the related modules to isolate the fault.

Well, we have received a bad unit, extracted information on the symptoms, logically narrowed the possible causes of the problem, replaced the likely defective module, and returned the unit to operation. The key is to perform this task in as short a time as we can so that the customer is back up and running as soon as possible.

The most effective method for rapid service is modular replacement. It is for that concept that we are promoting block diagram awareness of the ACE equipment to facilitate those replacements. If we gave in-depth circuit analysis and IC level replacement training, the technicians would have to spend more time than necessary to keep his customers satisfied. With the warranty replacement policy offered by Franklin Computer Corporation, both the customer and the dealer are better served.

Consider this troubleshooting exercise as one of a logical analysis of the ACE 100 rather than a quiz on circuitry. The best experience is in considering problems that may actually occur on a system. Let's look at a few of the typical problems.

TROUBLESHOOTING GUIDE

SYMPTOM	CHECK THE FOLLOWING
DEAD SYSTEM (NO POWER LIGHT)	1. CHECK POWER CORD CONNECTION 2. CHECK POWER SUPPLY CONNECTOR AT MOTHERBOARD 3. CHECK OUTPUT OF SUPPLY WITH METER 4. REPLACE IF BAD OUTPUT
POWER LIGHT ON - NO RESPONSE	1. REMOVE 16K RAM CARD 2. REMOVE RAM IN ROWS D AND E 3. IF STILL NO RESPONSE, REPLACE RAM IN ROW C 4. IF STILL NO RESPONSE, REPLACE ROM IN ROW G 5. IF NO RESPONSE, REPLACE MOTHERBOARD
ROM OR RAM FAILURE	1. REPLACE INDICATED IC 2. IF STILL BAD, REPLACE MOTHERBOARD
NO VIDEO	1. VERIFY MONITOR O.K.

	2.	CHECK CONNECTOR ON MOTHERBOARD
	3.	IF STILL BAD, REPLACE MOTHERBOARD
NO CHARACTERS FROM KEYBOARD	1.	VERIFY LOCK KEY OPERATION
	2.	REPLACE KEYBOARD CABLE
	3.	REPLACE KEYBOARD
	4.	IF STILL BAD, REPLACE MOTHERBOARD
SOME CHARACTERS O.K. OTHERS INCORRECT	1.	REPLACE KEYBOARD CABLE
	2.	REPLACE KEYBOARD ENCODER
	3.	REPLACE KEYBOARD
	4.	REPLACE CHARACTER GEN. - A6
	5.	REPLACE MOTHERBOARD
DISKETTE WILL NOT LOAD	1.	VERIFY DRIVE SELECT LAMP ON
	2.	TRY A DIFFERENT DISKETTE
	3.	REPLACE CONTROLLER CARD
	4.	REPLACE DISK DRIVE
	5.	REPLACE MOTHERBOARD

EXERCISE

Test the ACE 100 with disk drives at this work station. As you find each problem, show it and the solution to the course instructor. Verify with the instructor that you have found all of the problems in the system.

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SECTION 10

OVERVIEW

The product warranty and the warranty reimbursement plan are both important aspects of the Franklin Computer Corporation Dealer Service Plan. It is necessary for the dealer to thoroughly understand the warranty coverage provided and the proper method for applying for warranty reimbursement.

The purpose of this section is to provide the service dealer with test examples of possible warranty situations. If the warranty is valid, the dealer will fill out a warranty service report with the neccary information to effect a reimbursement for his services.

PREREQUISITES

None

EQUIPMENT REQUIRED

The only item required for this section is the Dealer Service Manual.

EXERCISE

Thoroughly read Section 3 of the Dealer Service Manual. This section defines warranty coverage and details the procedures to use in applying for warranty reimbursement.

Answer the practice exercises listed below. If a warranty claim is valid in your opinion, fill out the Warranty Service Report in full.

If you feel that the warranty claim is not valid, indicate why. If the customer is to be charged for the service, provide a list of the charges including parts and labor.

On completion of all practice exercises, discuss your answers and Warranty Service Reports with the course instructor.

PRACTICE EXERCISE 1

Answer the following questions in writing. Do not fill out a Warranty Service Report.

1. What is the warranty period for the Franklin ACE products?

2. What items are covered by the warranty?

3. Name several items not covered by the warranty.

4. Is there ever a condition which will effectively extend the warranty on a product? If so, explain.

PRACTICE EXERCISE 2

A customer (Wilber Hall, 3222 Willow Way, New York, N.Y. 08080) purchased an ACE computer by mail order from a California firm. He brings it into a New York Authorized Service Center for repair withim 90 days of the date of purchase. The problem is found to be a defective power supply and it is replaced.

PRACTICE EXERCISE 3

A customer (Ted Anderson, 33 Phoenix Ct., Hartford, Ct.) returns an ACE 100 to an Authorized Service Center for repair. The customer does not have proof of purchase however a call to FCC confirms the purchase date as within 90 days. The keyboard is replaced.

PRACTICE EXERCISE 4

A customer (Hall Williams, 66 44th St., Anson, Ga. 88888) brings an ACE 100 in for service. He claims that the unit is in warranty but does not have proof of purchase. A call to FCC cannot confirm that the warranty was ever registered. The problem is diagnosed as a defective motherboard and it is replaced.

PRACTICE EXERCISE 5

A customer (Jane Doe, 33 Billings St., Provo, Utah 22222) brings a disk drive with controller in for service. She has proof of purchase which is within 90 days. The problem is diagnosed as a visibly blown 74LS125 IC on the disk drive analog card. The card is replaced.

PRACTICE EXERCISE 6

A customer (Henry Hart, 23 Williams St., Wilmington, De. 33333) brings a Franklin ACE 100 in for service. He has proof of purchase which is within 90 days. The problem is diagnosed as a defective keyboard. The problem is cured by replacing one keyswitch element.

PRACTICE EXERCISE 7

A customer (Alice Stans, 79 22nd St., St. Louis, Mo. 23456) brings an ACE 100 in for repair. The machine is over a year old. The computer was serviced two months ago and the power supply was replaced by an Authorized Service Center. The problem is again diagnosed as a defective power supply. The power supply is replaced.

FRANKLIN COMPUTER CORPORATION
7030 COLONIAL HIGHWAY
PENNSAUKEN, N.J. 08109
609 488-1700

DEALER SERVICE TRAINING

SECTION 11

OVERVIEW

To insure timely replacement to the Service Center of modules and parts, the service dealer must properly fill out the Defective Material Tag and return it to FCC with the defective module.

This section is a practice exercise in properly filling out the DMT tag.

PREREQUISITES

Sections 1 and 10

EQUIPMENT NECESSARY

The only item necessary for this exercise is the Dealer Service Manual.

EXERCISE

Thoroughly read and understand Section 2, part 2 of the Dealer Service Manual.

Complete Section 10 of the training portion of this manual (Warranty Exercises).

Using the examples in the Warranty Exercises, determine if any DMT tags are to be filled out. Properly fill out DMT's for all appropriate examples.

Present your DMT examples to the course instructor for discussion.

TECHNICAL INFORMATION BULLETIN

FRANKLIN
COMPUTER CORPORATION
7030 Colonial Highway
Pennsauken, NJ 08109
609-488-1700

BULLETIN #: INV-002.1 DATE: 08/30/83
SUBJECT: ACE 1000/1200 PARTS KIT

Franklin Computer Corporation authorized dealers will be required to purchase an ACE 1000/1200 spare parts kit upon appointment as an Authorized Service Center. The contents and cost of the kit is as follows:

ACE COMPUTER SPARE PARTS KIT - #1000013

PART #	DESCRIPTION	QUANTITY	PRICE	TOTAL
1100018-10	MOTHERBOARD (COLOR)	1	$343.39	$343.39
1200009B	POWER SUPPLY	1	137.57	137.57
5018504B	KEYBOARD	1	115.01	115.01
1300001	SPEAKER & CABLE	1	2.99	2.99
4013531	18" DIP CABLE	2	4.56	9.12
1331400.1	A6 EPROM (A6)	1	9.87	9.87
1331401.2	F8 EPROM (G2)	1	9.87	9.87
1331402.0	F0 EPROM (G3)	1	9.87	9.87
1331403.0	E8 EPROM (G5)	1	9.87	9.87
1331404.0	E0 EPROM (G7)	1	9.87	9.87
1331405.0	D8 EPROM (G8)	1	9.87	9.87
1331406.0	D0 EPROM (G10)	1	9.87	9.87
4002536.0	4116 RAM	4	2.40	9.60
4031500	POWER CABLE	1	5.16	5.16
4004507	SWITCH	2	3.69	7.38
4005501	FAN	1	19.17	19.17
4031507	PHONO CABLE	2	1.27	2.54
4034501	CRYSTAL	1	1.92	1.92
4006700	L.E.D.	2	.48	.96
5022502	BUMPER	4	.34	1.36
1331519	DIAGNOSTIC DISKETTE	1	25.00	25.00
1331520	ALIGNMENT DISKETTE	1	25.00	25.00
7005036	TECHNICAL REFERENCE MANUAL	1	25.00	25.00

TOTAL	$800.26
10% DISCOUNT WHEN PURCHASED AS A FULL KIT	-80.02
TOTAL	$720.24

Diagnostic and Alignment Diskettes and the Technical Reference Manual are not required on reorders. They are available if requested.

TECHNICAL INFORMATION BULLETIN

FRANKLIN
COMPUTER CORPORATION
7030 Colonial Highway
Pennsauken, NJ 08109
609-488-1700

BULLETIN #: INV-003.1 DATE: 08/30/83
SUBJECT: FLOPPY DISK SUBSYSTEM PARTS KIT

Franklin Computer Corporation authorized dealers will be required to purchase a floppy disk subsystem parts kit upon appointment as an Authorized Service Center. The contents and cost of the kit is as follows:

ACE 10 DISK SUBSYSTEM SPARE PARTS KIT - #1000014

PART #	DESCRIPTION	QUANTITY	PRICE	TOTAL
1100005	DISK CONTROLLER	1	$ 54.41	$ 54.41
1100004	DISK ANALOG CARD	1	64.77	64.77
4018019	DISK MECH ASSY	1	178.50	178.50
4013532	DISK I/O CABLE	1	17.42	17.42
4002559	74LS125 IC	2	.91	1.82
1331407.0	EPROM (DISK CONTROLLER)	1	10.32	10.32
4018029	LOAD PAD	2	2.40	4.80
4018030	DRIVE BELT	1	6.00	6.00
4018031	ACTIVITY LAMP	2	2.10	4.20
4018032	WRITE PROTECT SWITCH	2	3.48	6.96
4018033	DOOR ASSEMBLY	2	3.00	6.00

SUB TOTAL	$355.20
10% DISCOUNT WHEN PURCHASED AS A FULL KIT	-35.52
TOTAL	$319.68

TECHNICAL INFORMATION BULLETIN

FRANKLIN
COMPUTER CORPORATION
7030 Colonial Highway
Pennsauken, NJ 08109
609-488-1700

BULLETIN #: INV-004 DATE: 09/12/83
SUBJECT: FRANKLIN PERIPHERAL CARDS

FRANKLIN PERIPHERAL CARD KIT - #1000014.4

PART #	DESCRIPTION	QUANTITY	PRICE	TOTAL
1100012	80 COLUMN DISPLAY CARD	1	$115.00	$115.00
1100013	DUAL I/O CARD	1	120.00	120.00
1100020	Z80 - CP/M CARD	1	225.00	225.00

TOTAL * $ 460.00

* KIT PRICE FOR ALL THREE BOARDS IS: $ 380.00

TECHNICAL INFORMATION BULLETIN

FRANKLIN
COMPUTER CORPORATION
7030 Colonial Highway
Pennsauken, NJ 08109
609-488-1700

BULLETIN #: DPA-001.1 DATE: 09/07/83
SUBJECT: ACE 1000/1200 DEALER PARTS LIST

ACE 1000/1200 SPARE PARTS LIST

PART NUMBER	DESCRIPTION	DEALER NET	LIST PRICE
1000013	ACE 1000/1200 PARTS KIT	720.24	0.00
1000014	DISK DRIVE PARTS KIT	319.68	0.00
1000019	ACE COLOR MOD KIT 1000B	38.00	65.00
1100001	KEYBOARD ADAPTER ASSY.	19.52	32.54
1100002	16K RAM CARD	60.67	101.12
1100004	DISK ANALOG CARD	64.77	107.96
1100005	DISK CONTROLLER	54.41	90.67
1100007	KEYBOARD ADAPTER ASSY.	17.01	28.35
1100012**	80 COLUMN DSPLY CARD	123.00	199.00
1100013**	DUAL I/O CARD	120.00	229.00
1100018-10	MOTHERBOARD - COLOR	343.39	568.56
1100020**	Z80 - CP/M CARD	225.00	449.00
1200009	POWER SUPPLY	137.57	211.75
1200015	SER CABLE + BRKT FOR I/O BOARD	22.17	36.95
1200016	PAR CABLE + BRKT FOR I/O BOARD	24.95	41.58
1300001	CABLE ASSY. - SPEAKER	2.99	4.99
1300003	18 INCH - 16 PIN CABLE ASSY.	4.98	8.30
1300006	CABLE - 7 IN. 16 DIP PIN ASSY.	7.80	13.00
1300012	COLOR CABLE 16 TO 4-PIN ASSY.	2.94	4.90
1300013	CABLE ASSY-COLOR MOD "A"	0.30	0.50
1300014	CABLE ASSY-COLOR MOD "B"	2.29	3.82
1300017	CABLE ASSY. - 80 X 24 ADAPTER	4.83	8.06
1300019	CAB. SER/PAR-CENTRONICS	12.66	21.10
1300020	CAB. SER/PAR-DB25	10.41	17.35
1300022	CABLE 9" FOR KEYBD TO LED	3.18	5.30
1300025	CABLE - SERIAL INTERFACE	33.75	56.25
1300028	CABLE - PARALLEL INTERFACE	30.00	36.00
1331400.1	A6 EPROM (A-6)	9.87	16.45

* ALL PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

** THE DEALER PRICE FOR THE THREE MODULES PURCHASED AS PACKAGE IS: $397.80.

1331401.0	F8 EPROM (G-2)	9.87	16.45
1331401.2	F8 EPROM (G-2)	9.87	16.45
1331402.0	F0 EPROM (G-3)	9.87	16.45
1331403.0	E8 EPROM (G-5)	9.87	16.45
1331404.0	E0 EPROM (G-7)	9.87	16.45
1331405.0	D8 EPROM (G-8)	9.87	16.45
1331406.0	D0 EPROM (G-10)	9.87	16.45
1331407.0	EPROM (DISK CONTROLLER)	10.32	17.20
1331411	EPROM-80X24 DSPLY	8.10	13.49
1331419	EPROM 2.3	8.16	13.60
1331424	EPROM-CHAR SET	8.10	13.49
1331519	DISK-DYSAN ALIGNMENT	25.00	0.00
1331520	DISK - DEALER DIAGNOSTIC	25.00	0.00
4001006	200 OHM POTENTIOMETER	0.30	0.50
4001556	CAP. 1100 PFD. 50 V.	0.24	0.41
4001560	200 MFD. 16V. CAP	0.48	0.80
4001561	470 MFD CAPACITOR 6.3 V.	0.48	0.80
4001562	CAP. 15 MFD. - 35 V.	0.35	0.58
4001582	CAP. - 1000 Pf. - 50 V.	0.28	0.47
4002500	7404 IC	0.86	1.44
4002501	74166 IC	1.63	2.72
4002502	74LS00 IC	0.72	1.20
4002503	74LS02 IC	0.72	1.20
4002505	74LS08 IC	0.72	1.20
4002507	74LS11 IC	0.72	1.20
4002508	74LS20 IC	0.72	1.20
4002509	LS32 IC	0.82	1.36
4002510	74LS51 IC	0.72	1.20
4002511	74LS74 IC	0.86	1.44
4002512	LS86 IC	0.91	1.52
4002513	74LS138 IC	1.15	1.92
4002514	74LS139 IC	1.15	1.92
4002515	74LS151 IC	1.06	1.76
4002516	74LS153 IC	1.06	1.76
4002517	74LS161 IC	1.06	1.76
4002518	74LS174 SIGN-MOTTO	1.15	1.92
4002520	74LS194 IC	1.54	2.56
4002521	74LS251 IC	1.15	1.92
4002522	74LS257 IC	1.06	1.76
4002523	74LS259 IC	1.74	2.90
4002524	74LS283 IC	1.30	2.16
4002525	74LS367 IC	1.10	1.84
4002526	74S86 IC	1.30	2.16
4002527	LS195 IC	0.96	1.60
4002528	555 TIMER	0.86	1.44
4002529	558 TIMER	2.55	4.25
4002532	6502 MICRO-PROCESSOR	8.25	13.75
4002533	8T28 IC	1.53	2.55
4002534	8T97 IC	1.63	2.72
4002536	16K RAM CHIP	2.40	4.00
4002537	7400 IC	0.91	1.52
4002539	74LS175	2.35	3.92
4002540	74S195 IC	2.16	3.60
4002541	74LS27	0.72	1.20
4002542	74LS373 IC	2.26	3.76

4002543	74LS14 IC	0.96	1.60
4002547	3054 IC	1.68	2.80
4002548	311	0.96	1.60
4002550	592	1.59	2.65
4002551	74LS05 IC	0.82	1.36
4002552	74LS123 IC	1.25	2.08
4002553	74LS163 IC	1.10	1.84
4002555	9334 IC	1.77	2.95
4002558	LN2003 IC	2.16	3.60
4002559	74LS125 IC	1.01	1.68
4002561	74LS109 IC	0.96	1.60
4002562	556	1.44	2.40
4002564	74LS10 IC	0.65	1.08
4002565	74LS165 IC	1.15	1.92
4002568	74LS174 TX INST-NATL SEMIC	0.96	1.60
4002574	IC TBP24S10	2.88	4.80
4002576	74LS374 IC	1.68	2.80
4002578	IC 1488 (75188)	1.34	2.24
4002579	IC 1489 (75189)	1.34	2.24
4002584	74LS393 IC	2.02	3.36
4002585	IC Z80B MICRO-PROC	12.45	20.75
4002586	74LS158 IC	1.34	2.24
4002588	64K DYNAMIC RAM	11.40	19.00
4004503	SWITCH (RESET)	7.65	12.75
4004507	SWITCH (RESET)	3.69	6.15
4004512	SWITCH-ROCKER "ON-OFF"	2.11	3.52
4005500	FAN - 220 - 230V	22.09	36.81
4005501	FAN - 110 V.	19.17	31.95
4006500	1N914 - DIODE	0.11	0.18
4006700	LED	0.48	0.80
4007001	2N4258 TRANSISTOR	0.37	0.62
4007002	TRANSISTOR MPS A13	0.32	0.54
4007003	TRANSISTOR 2N2222A	0.24	0.40
4007005	MPS-U51	1.20	2.00
4010002	14 PIN SOCKET	0.19	0.32
4010003	16 PIN SOCKET	0.24	0.40
4010004	24 PIN SOCKET	0.38	0.64
4010005	40 PIN SOCKET	0.67	1.12
4010520	50 PIN CONNECTOR SOCKET	2.58	4.30
4013531	18" CABLE DIP CONN	4.56	7.60
4013532	DISK I/O CABLE	17.42	29.03
4013580	33" SHLDED DISK DRIVE CABLE	17.15	28.58
4018019	DISK MECHANICAL ASSEMBLY	178.50	297.50
4018029	LOAD PAD	2.40	4.00
4018030	DRIVE BELT	6.00	10.00
4018031	ACTIVITY LAMP	2.10	3.50
4018032	WRITE PROTECT SWITCH	3.48	5.80
4018033	DOOR ASSEMBLY	3.00	5.00
4022007	LRG NYLON SPACER #4 RND	2.40	4.00
4024500	CONN-PHONO FEM RT-ANGLE	0.07	0.12
4027003	CON.100 CTR WAFER 4-PIN LOCK	0.77	1.29
4030000	SPEAKER - 8 OHM - .25W	1.92	3.20
4031500	POWER CABLE	5.16	8.60

4031501	SUPERSEDED BY 4031500	0.00	0.00
4031507	PHONO CABLE MALE/MALE	1.27	2.12
4031513	CABLE 60" PARA. FOR DUAL I/O	38.21	63.68
4034501	CRYSTAL 14.31818 MHz	1.82	3.04
4034504	CRYSTAL 17.43 MHz	2.02	3.36
4036000	PAINT-BEIGE-TOUCH-UP 1 OZ.	1.00	1.67
5018500	KEYBOARD	115.01	177.03
5018504	KEYBOARD ACE 1000 B/C NEW DESIGN	116.95	194.92
5019016	ACE 1200 LOGO	0.58	0.96
5019018	ACE 1000 LOGO	0.58	0.96
5020002	ACE 10 STRAIN RELIEF CLAMP	0.89	1.48
5021305P	METAL CASE - PAINTED ACE 10	13.82	23.04
5021306P	ACE 10 BASE - PAINTED	14.88	24.80
5021311-1	BASE - ALUMINUM (ACE 1000)	20.41	34.02
5021312	PLATE - MAG SHLD ACE 1100/1200	7.20	12.00
5022005	NYLON SPACER 1/4 X 7/16	0.38	0.64
5022502	FEET-PLASTIC-4	0.34	0.56
5035500	ACE 100 - CASE (BASE)	99.53	165.88
5035502	ACE 100 - CASE (TOP)	45.93	76.55
5035511	ACE 1000 - CASE (BASE)	30.32	50.54
5035512	ACE 1000 - CASE (TOP)	26.03	43.38
5035513	ACE 1000 - LATCH	4.08	6.80
5035514	CASE-TOP-ACE 1200	41.96	69.93
5035516	CASE-BLANK PLATE	3.87	6.45

TECHNICAL INFORMATION BULLETIN

FRANKLIN
COMPUTER CORPORATION
7030 Colonial Highway
Pennsauken, NJ 08109
609-488-1700

BULLETIN #: RPA-001.1 DATE: 08/30/83
SUBJECT: ACE 1000/1200 RETAIL PARTS LIST

ACE 1000/1200 RETAIL PARTS LIST

PART NUMBER	DESCRIPTION	LIST PRICE
1000019	ACE COLOR MOD KIT 1000B	65.00
1100001	KEYBOARD ADAPTER ASSY.	32.54
1100002	16K RAM CARD	101.12
1100004	DISK ANALOG CARD	107.96
1100005	DISK CONTROLLER	90.67
1100007	KEYBOARD ADAPTER ASSY.	28.35
1100012**	80 COLUMN DISPLAY CARD	199.00
1100013**	DUAL I/O CARD	229.00
1100018-10	MOTHERBOARD - COLOR	568.56
1100020**	Z80 - CP/M CARD	449.00
1200009	POWER SUPPLY	211.75
1200015	SER CABLE + BRKT FOR I/O BOARD	36.95
1200016	PAR CABLE + BRKT FOR I/O BOARD	41.58
1300001	CABLE ASSY. - SPEAKER	4.99
1300003	18 INCH - 16 PIN CABLE ASSY.	8.30
1300006	CABLE - 7 IN. 16 DIP PIN ASSY.	13.00
1300012	COLOR CABLE 16 TO 4-PIN ASSY.	4.90
1300013	CABLE ASSY-COLOR MOD "A"	0.50
1300014	CABLE ASSY-COLOR MOD "B"	3.82
1300017	CABLE ASSY. - 80 X 24 ADAPTER	8.06
1300019	CAB. SER/PAR-CENTRONICS	21.10
1300020	CAB. SER/PAR-DB25	17.35
1300022	CABLE 9" FOR KEYBOARD TO LED	5.30
1300025	CABLE - SERIAL INTERFACE	56.25
1300028	CABLE - PARALLEL INTERFACE	36.00
1331400.1	A6 EPROM (A-6)	16.45
1331401.0	F8 EPROM (G-2)	16.45
1331401.2	F8 EPROM (G-2)	16.45
1331402.0	F0 EPROM (G-3)	16.45
1331403.0	E8 EPROM (G-5)	16.45
1331404.0	E0 EPROM (G-7)	16.45
1331405.0	D8 EPROM (G-8)	16.45
1331406.0	D0 EPROM (G-10)	16.45
1331407.0	EPROM (DISK CONTROLLER)	17.20
1331411	EPROM-80X24 DISPLAY	13.49
1331419	EPROM 2.3	13.60
1331424	EPROM-CHAR SET	13.49
4001006	200 OHM POTENTIOMETER	0.50
4001556	CAP. 1100 PFD. 50V.	0.41
4001560	200 MFD. 16V. CAP	0.80

4001561	470 MFD CAPACITOR 6.3 V.	0.80
4001562	CAP.-15MFD. - 35 V.	0.58
4001582	CAP.-1000 Pf.-50V.	0.47
4002500	7404 IC	1.44
4002501	74166 IC	2.72
4002502	74LS00 IC	1.20
4002503	74LS02 IC	1.20
4002505	74LS08 IC	1.20
4002507	74LS11 IC	1.20
4002508	74LS20 IC	1.20
4002509	LS32 IC	1.36
4002510	74LS51 IC	1.20
4002511	74LS74 IC	1.44
4002512	LS86 IC	1.52
4002513	74LS138 IC	1.92
4002514	74LS139 IC	1.92
4002515	74LS151 IC	1.76
4002516	74LS153 IC	1.76
4002517	74LS161 IC	1.76
4002518	74LS174 SIGN-MOTO	1.92
4002520	74LS194 IC	2.56
4002521	74LS251 IC	1.92
4002522	74LS257 IC	1.76
4002523	74LS259 IC	2.90
4002524	74LS283 IC	2.16
4002525	74LS367 IC	1.84
4002526	74S86 IC	2.16
4002527	LS195 IC	1.60
4002528	555 TIMER	1.44
4002529	558 TIMER	4.25
4002532	6502 MICRO-PROCESSOR	13.75
4002533	8T28 IC	2.55
4002534	8T97 IC	2.72
4002536	16K RAM CHIP	4.00
4002537	7400 IC	1.52
4002539	74LS175	3.92
4002540	74S195 IC	3.60
4002541	74LS27	1.20
4002542	74LS373 IC	3.76
4002543	74LS14 IC	1.60
4002547	3054 IC	2.80
4002548	311	1.60
4002550	592	2.65
4002551	74LS05 IC	1.36
4002552	74LS123 IC	2.08
4002553	74LS163 IC	1.84
4002555	9334 IC	2.95
4002558	LN2003 IC	3.60
4002559	74LS125 IC	1.68
4002561	74LS109 IC	1.60
4002562	556	2.40
4002564	74LS10 IC	1.08
4002565	74LS165 IC	1.92
4002568	74LS174 TX INST-NATL SEMIC	1.60
4002574	IC TBP24S10	4.80

4002576	74LS374 IC	2.80
4002578	IC 1488 (75188)	2.24
4002579	IC 1489 (75189)	2.24
4002584	74LS393 IC	3.36
4002585	IC Z80B MICRO-PROC	20.75
4002586	74LS158 IC	2.24
4002588	64K DYNAMIC RAM	19.00
4004503	SWITCH (RESET) 100	12.75
4004507	SWITCH (RESET) 1000/1200	6.15
4004512	SWITCH-ROCKER "ON-OFF"	3.52
4005500	FAN - 220-230V	36.81
4005501	FAN - 110V.	31.95
4006500	LN914 - DIODE	0.18
4006700	LED	0.80
4007001	2N4258 TRANSISTOR	0.62
4007002	TRANSISTOR MPS A13	.54
4007003	TRANSISTOR 2N2222A	.40
4007005	MPS-U51	2.00
4010002	14 PIN SOCKET	0.32
4010003	16 PIN SOCKET	0.40
4010004	24 PIN SOCKET	0.64
4010005	40 PIN SOCKET	1.12
4010520	50 PIN CONNECTOR SOCKET	4.30
4013531	18" CABLE DIP CONN	7.60
4013532	DISK I/O CABLE	29.03
4013580	33" SHIELDED DISK DRIVE CABLE	28.58
4018019	DISK MECHANICAL ASSEMBLY	297.50
4018029	LOAD PAD	4.00
4018030	DRIVE BELT	10.00
4018031	ACTIVITY LAMP	3.50
4018032	WRITE PROTECT SWITCH	5.80
4018033	DOOR ASSEMBLY	5.00
4022007	LRG NYLON SPACER #4 RND	4.00
4024500	CONN-PHONO FEM RT-ANGLE	0.12
4027003	CON.100 CTR WAFER 4-PIN LOCK	1.29
4030000	SPEAKER - 8 OHM - .25W	3.20
4031500	POWER CABLE	8.60
4031507	PHONO CABLE MALE/MALE	2.12
4031513	CABLE 60" PARA. FOR DUAL I/O	63.68
4034501	CRYSTAL 14.31818 MHz	3.20
4034504	CRYSTAL 17.43 MHz	3.04
4036000	PAINT-BEIGE-TOUCH-UP 1 OZ.	1.67
5018500	KEYBOARD	177.03
5018504	KEYBRD ACE 1000 B/C NEW DSGN	194.92
5019016	ACE 1200 LOGO	0.96
5019018	ACE 1000 LOGO	0.96
5020002	ACE 10 STRAIN RELIEF CLAMP	1.48
5021305P	METAL CASE - PAINTED ACE 10	23.04
5021306P	ACE 10 BASE - PAINTED	24.80
5021311-1	BASE - ALUMINUM (ACE 1000)	34.02
5021312	PLATE-MAG SHLD ACE 1100/1200	12.00
5022005	NYLON SPACER 1/4 X 7/16	.64
5022502	FEET-PLASTIC-4	0.56
5035500	ACE 100 - CASE (BASE)	165.88
5035502	ACE 100 - CASE (TOP)	76.55

5035511	ACE 1000 - CASE (BASE)	50.54
5035512	ACE 1000 - CASE (TOP)	43.38
5035513	ACE 1000 - LATCH	6.80
5035514	CASE-TOP-ACE 1200	69.93
5035516	CASE-BLANK PLATE	6.45

NOTE: ALL PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

TECHNICAL INFORMATION BULLETIN

FRANKLIN
COMPUTER CORPORATION
7030 Colonial Highway
Pennsauken, NJ 08109
609-488-1700

BULLETIN #: ACI-006 DATE: 09/22/83
SUBJECT: DUAL I/O CARD PRINTER INTERFACING

This bulletin contains specific information on how to connect the following printers to the Franklin ACE Dual Interface Card:

TI 820 RO	(Serial)
Qume S9/45	(Serial)
NEC Spinwriter 3510	(Serial)
NEC Spinwriter 7710, 7715, 7720, 7725	(Serial)
Okidata M93	(Parallel)
Epson FX-80, MX-80	(Parallel)
Smith-Corona TP-1	(Parallel)
C. Itoh Prowriter 8510	(Parallel)

The instructions tell you how to set printer control switches (or program the printer) and set switches on the ACE Dual Interface Card.

If you have a parallel printer, you can use the Franklin 5-foot parallel cable or any Centronics-type parallel cable without changing it. For some serial printers (the Qume, for instance), the Franklin 6-foot cable is suitable for operation at any speed. Both cables are available from your Franklin dealer.

If you want to operate other serial printers at high speeds (the TI and NEC, for instance), you'll need to build a custom cable to transmit certain signals from the printer to the Dual Interface Card. This bulletin tells you which lines your custom cable should connect. It also tells you how to select slower printer speeds if you don't want to make a special cable.

You'll find illustrations and more information in the Franklin ACE Dual Interface Card User Reference Manual.

Franklin has successfully connected the ACE Dual Interface Card to each of these printers using the instructions in this bulletin. However, Franklin does not control the design or manufacture of the printers, and therefore cannot unconditionally guarantee that these instructions will work for your printer, even if it is one of those listed above.

FRANKLIN ACE DUAL INTERFACE CARD SWITCH FUNCTION CHART

SWITCH GROUP 1

This switch group determines which slot on the motherboard functions as the serial port. If you're using the serial port, turn ONE and ONLY ONE of these switches ON. It must correspond to a vacant slot. Use the slot numbers marked on the Dual Interface Card itself, not the DIP switch. If you're only using a parallel device, turn ALL switches in group 1 OFF.

SWITCH GROUP 2

Switch # 1	ON	Parity disabled	OFF	Parity enabled
Switch # 2	ON	Parity odd	OFF	Parity even
Switch # 3	ON	Seven data bits	OFF	Eight data bits

Switches 4, 5, 6, and 7 control the baud rate. See page 5-18 of the _Franklin ACE Dual Interface Card User Reference Manual_ for switch settings.

SWITCH GROUP 3

A switch in the ON position puts the signal in column 1 onto the line in column 2. The OFF position disconnects them. For almost all applications, there are only four settings of this switch group. Refer to pages 5-13 through 5-16 of the _Franklin ACE dual Interface Card User Reference Manual._

Switch # 1	Data Terminal Ready	Line 20
Switch # 2	Clear To Send	Line 20
Switch # 3	Clear To Send	Line 5
Switch # 4	Request To Send	Clear To Send
Switch # 5	Receive Data	Line 3
Switch # 6	Receive Data	Line 2
Switch # 7	Transmit Data	Line 3
Switch # 8	Transmit Data	Line 2

The jumper (page 5-17) disables the Request to Send signal generated by the Dual Interface Card.

TI 820 RO (serial printer)

Programming the Printer

Set the baud rate, half or full duplex, and parity using the programmable keypad on the front panel of the printer. For more details, follow the instructions provided by TI.

Dual Interface Switch Settings -- High Speed Operation

Example: Printer runs at 9600 baud, full duplex, and no parity:

Switch #	1	2	3	4	5	6	7	8
Switch Group 1	ON	OFF	OFF	OFF	OFF	OFF	OFF	
2	ON	ON	OFF	OFF	OFF	ON	OFF	
3	OFF	ON	OFF	OFF	OFF	ON	ON	OFF

To set the printer to a different baud rate or parity, refer to page 5-18 of the Franklin ACE Dual Interface Card User Reference Manual to find the appropriate settings for Switch Group 2. Use the settings listed above for Switch Groups 1 and 3.

Dual Inteface Switch Settings -- Low Speed Operation

Example: Printer runs at 1200 baud, full duplex, and no parity:

Switch #	1	2	3	4	5	6	7	8
Switch Group 1	ON	OFF	OFF	OFF	OFF	OFF	OFF	
2	ON	ON	OFF	ON	OFF	OFF	ON	
3	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF

Cabling

You can operate your printer at low speed (1200 baud or less) with Franklin's 6-foot serial cable or any standard RS-232 cable.

If you want to operate your printer at high speed (higher than 1200 baud), your cable must connect the pins listed below:

Dual Interface Card (DB-25 male plug)	Printer (DB-25 male plug)
2	2
3	3
20	11

PLUG THE DUAL INTERFACE CARD INTO SLOT 2 OF THE COMPUTER

QUME S9/45 (serial printer)

Printer Switch Settings

Lift the top cover of the Qume printer. You'll see two groups of minature switches at the front, with an upside-down row of numbers at the top rear of each switch group. The switches are numbered in order, switch 8 at the left and switch 1 at the right. The ON position is toward the rear of the printer and OFF is toward the front.

Example: These switch settings select 1200 baud, no parity, half duplex, and non-modem communications:

Left switch group ("A" switches):

Switch #	8	7	6	5	4	3	2	1
	ON	OFF	ON	ON	OFF	ON	OFF	OFF

Right switch group ("B" switches): All switches OFF

If you want to use a different setting, follow the instructions provided with your printer.

Dual Interface Switch Settings -- High Speed Operation

Example: 1200 baud, eight data bits, and no parity:

Switch #	1	2	3	4	5	6	7	8
Switch Group 1	ON	OFF	OFF	OFF	OFF	OFF	OFF	
2	ON	ON	OFF	OFF	ON	ON	ON	
3	OFF	ON	OFF	OFF	OFF	ON	ON	OFF

To select another baud rate or parity, see page 5-18 of the Franklin ACE Dual Interface Card User Reference Manual.

Cabling

The Franklin 6-foot serial cable or any RS-232 standard cable works without modification. It must connect these pins:

Dual Interface Card (DB-25 male plug)	Printer (DB-25 male plug)
2	2
3	3
5	5
7	7
20	20

Follow the instructions on pages 5-16 and 5-17 of the Franklin ACE Dual Interface Card User Reference Manual to open the electrical contact on the Dual Interface Card.

PLUG THE DUAL INTERFACE CARD INTO SLOT 2 OF THE COMPUTER

NEC SPINWRITER 3510 (serial printer)

Printer Switch Settings -- High Speed Operation

Example: To select 1200 baud and no parity:

Set the tumble wheel marked "speed" on the front panel to 5. Set all switches on the front panel to the DOWN position.

If you want to use a different setting, follow the instructions provided with your printer.

Dual Interface Switch Settings -- High Speed Operation

Example: 1200 baud, seven data bits, and no parity:

Switch #	1	2	3	4	5	6	7	8
Switch Group 1	ON	OFF	OFF	OFF	OFF	OFF	OFF	
2	ON	OFF	ON	OFF	ON	ON	ON	
3	OFF	ON	OFF	OFF	OFF	ON	ON	OFF

To select another baud rate or parity, see page 5-18 of the Franklin ACE Dual Interface Card User Reference Manual.

Cabling

Your Franklin 6-foot serial cable or other standard RS-232 cable will require a modification or extension to connect the pins listed below:

Dual Interface Card (DB-25 male plug)	Printer (DB-25 male plug)
2	2
3	3
6	6
7	7
8	8
20	19

PLUG THE DUAL INTERFACE CARD INTO SLOT 2 OF THE COMPUTER

NEC SPINWRITER 7710, 7715, 7720, 7725 (serial printer)
(Standard Feature Set)

Printer Switch Settings -- High Speed Operation

Lift the front cover of the NEC printer. You'll see one group of eight switches and three groups of four. They're numbered in order from left to right. The UP position turns the switch ON, and DOWN is OFF.

Example: To select 1200 baud, half duplex, and even parity;

Switch #	1	2	3	4	5	6	7	8
Switch Group 1	OFF	OFF	OFF	OFF	ON	OFF	OFF	
2	OFF	OFF	OFF	OFF				
3	ON	ON	ON	OFF				
4	ON	ON	OFF	OFF				

If you want to use a different setting, follow the instructions provided with your printer.

Dual Interface Switch Settings -- High Speed Operation

Example: 1200 baud, seven data bits, and even parity:

Switch #	1	2	3	4	5	6	7	8
Switch Group 1	ON	OFF	OFF	OFF	OFF	OFF	OFF	
2	OFF	OFF	ON	OFF	ON	ON	ON	
3	OFF	ON	OFF	OFF	OFF	ON	ON	OFF

To select another baud rate or parity, see page 5-18 of the Franklin ACE Dual Interface Card User Reference Manual.

Cabling

Your Franklin 6-foot serial cable or other standard RS-232 cable will require a modification or extension to connect the pins listed below:

Dual Interface Card (DB-25 male plug)	Printer (DB-25 male plug)
2	2
3	3
4	4
7	7
20	19

PLUG THE DUAL INTERFACE CARD INTO SLOT 2 OF THE COMPUTER

OKIDATA MICROLINE M92, M93 (parallel printer)

Printer Switch Settings

Remove the upper cover of the Okidata printer following the directions that came with your unit. The function control switches are in the front of the machine, next to the push buttons. All eight switches should be OFF.

Dual Interface Switch Settings

Example: Without a printer or modem attached to the Dual Interface Card serial port:

Switch #	1	2	3	4	5	6	7	8
Switch Group 1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	
2	CAN	BE	SET	IN	ANY	POSITION		
3	CAN	BE	SET	IN	ANY	POSITION		

Example: With a printer or modem attached to the Dual Interface Card serial port:

Switch #	1	2	3	4	5	6	7	8
Switch Group 1	OFF	ON	OFF	OFF	OFF	OFF	OFF	
2	SEE	INSTRUCTIONS		FOR	SERIAL	DEVICE		
3	SEE	INSTRUCTIONS		FOR	SERIAL	DEVICE		

Cabling

Use a Franklin 5-foot parallel cable or other Centronics-type parallel cable.

PLUG THE DUAL INTERFACE CARD INTO SLOT 1 OF THE COMPUTER

EPSON FX-80, MX-80 (parallel printers without Graftrax)

MX-80 Printer Switch Settings

Switch #	1	2	3	4	5	6	7	8
Switch Group 1	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON
2	OFF	OFF	OFF	OFF				

FX-80 Printer Switch Settings

Switch #	1	2	3	4	5	6	7	8
Switch Group 1	OFF	OFF	OFF	OFF	OFF	ON	ON	ON
2	ON	ON	OFF	OFF				

(The FX-80 will also operate adequately if its switches are left unchanged from the factory settings.)

Dual Interface Switch Settings

Example: Without a printer or modem attached to the Dual Interface Card serial port:

Switch #	1	2	3	4	5	6	7	8
Switch Group 1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	
2	CAN	BE	SET	IN	ANY	POSITION		
3	CAN	BE	SET	IN	ANY	POSITION		

Example: With a printer or modem attached to the Dual Interface Card serial port:

Switch #	1	2	3	4	5	6	7	8
Switch Group 1	OFF	ON	OFF	OFF	OFF	OFF	OFF	
2	SEE	INSTRUCTIONS		FOR	SERIAL	DEVICE		
3	SEE	INSTRUCTIONS		FOR	SERIAL	DEVICE		

Cabling

Use a Franklin 5-foot parallel cable or other Centronics-type parallel able.

PLUG THE DUAL INTERFACE CARD INTO SLOT 1 OF THE COMPUTER

SMITH-CORONA TP-1 (parallel printer)

Printer Switch Settings

The TP-1 contains no manual switch settings.

Dual Interface Switch Settings

Example: Without a printer or modem attached to the Dual Interface Card serial port:

Switch #	1	2	3	4	5	6	7	8
Switch Group 1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	
2	CAN	BE	SET	IN	ANY	POSITION		
3	CAN	BE	SET	IN	ANY	POSITION		

Example: With a printer or modem attached to the Dual Interface Card serial port:

Switch #	1	2	3	4	5	6	7	8
Switch Group 1	OFF	ON	OFF	OFF	OFF	OFF	OFF	
2	SEE	INSTRUCTIONS		FOR	SERIAL		DEVICE	
3	SEE	INSTRUCTIONS		FOR	SERIAL		DEVICE	

Cabling

Use a Franklin 5-foot parallel cable or other Centronics-type parallel cable.

PLUG THE DUAL INTERFACE CARD INTO SLOT 1 OF THE COMPUTER

C. ITOH PROWRITER 8510 (parallel printer)

Printer Switch Settings

To find the printer control switches, pull the front cover of the Prowriter straight forward. There are two groups of switches inside the printer case on the right side, marked SW 1 and SW 2.

These settings allow you to use most of the features of the printer.

Switch Group 1 -- switch 2 CLOSED, all others OPEN

Switch Group 2 -- all switches OPEN

Dual Interface Switch Settings

Example: Without a printer or modem attached to the Dual Interface Card serial port:

Switch #		1	2	3	4	5	6	7	8
Switch Group	1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	
	2	CAN	BE	SET	IN	ANY	POSITION		
	3	CAN	BE	SET	IN	ANY	POSITION		

Example: With a printer or modem attached to the Dual Interface Card serial port:

Switch #		1	2	3	4	5	6	7	8
Switch Group	1	OFF	ON	OFF	OFF	OFF	OFF	OFF	
	2	SEE	INSTRUCTIONS		FOR	SERIAL	DEVICE		
	3	SEE	INSTRUCTIONS		FOR	SERIAL	DEVICE		

Cabling

Use a Franklin 5-foot parallel cable or other Centronics-type parallel cable.

PLUG THE DUAL INTERFACE CARD INTO SLOT 1 OF THE COMPUTER

TECHNICAL INFORMATION BULLETIN

FRANKLIN
COMPUTER CORPORATION
7030 Colonial Highway
Pennsauken, NJ 08109
609-488-1700

BULLETIN #: ACI-007 DATE: 09/29/83
SUBJECT: KEYBOARD MODIFICATION KIT

The early microprocessor style keyboards in the ACE 1000/1200 do not recognize some of the ACEWriter commands. Two simple tests will determine which keyboard is installed in a computer:

1. If the red light on the LOCK key does not come on automatically when the power is applied to the machine, the keyboard is the pre microprocessor keyboard. These cannot be modified to give complete operation with ACEWriter.

2. If the light does come on automatically, proceed with this test. Type in and run the following BASIC program as shown:

```
NEW             RETURN
10 GET A$       RETURN
20 ? ASC(A$)    RETURN
RUN
```

Press CTRL SHIFT M at the same time on the keyboard. This is the code we want to test for. If the number printed on your screen is 29, the computer will work properly with ACEWriter. If the number printed is 13, the keyboard will need to be modified to work properly with ACEWriter.

A keyboard retrofit kit, part number 1000100, is available to make the necessary modification. This can be ordered from Technical Services with your normal parts ordering procedure.

TECHNICAL INFORMATION BULLETIN

FRANKLIN
COMPUTER CORPORATION
7030 Colonial Highway
Pennsauken, NJ 08109
609-488-1700

BULLETIN #: DSK-002.1 DATE: 09/08/83
SUBJECT: ACE 10 SUBSYSTEM ALIGNMENT PROCEDURES

1. INTRODUCTION

Errors when reading or writing diskettes can be caused by a number of factors. These include incorrect operating procedures, faulty programming, damaged diskettes, airborne contaminates, electrical interference, and misaligned disk drives. This Bulletin will deal with those problems associated with mechanical and electrical misalignment of the disk drive and controller units.

2. EQUIPMENT REQUIRED

A. Franklin ACE Computer and monitor.
B. Franklin ACE 10 Disk Drive with Controller.
C. Dual trace oscilloscope with 2 probes.
D. Dealer Diagnostic Diskette.
E. Alignment Diskette (Dysan 208/10 or equivalent).
F. Blank diskette.
G. Digital voltmeter

3. SETUP

TEST	EQUIPMENT				
	SCOPE	DIGITAL VOLTMETER	INIT. DISK	DISK DYSAN	FRANKLIN DIAGNOSTIC
AZIMUTH	X			X	X
TRACK ALIGNMENT	X			X	X
TRACK O STOP					
WRITE CURRENT		X			
DISK SPEED					X
R1, R2 CONTROLLER	X		X		
R/W VERIFY			X		X

4. AZIMUTH TEST

This test will indicate the condition of the read write head.

A. Connect the oscilloscope probes to TP1 and TP2 as shown in figure 2. Connect a ground from the scope to the (minus) side of C14. Set the scope controls to measure differential signals (A + B with the B channel inverted). Make certain that both A and B channels are set to the same volts per division.

B. Boot the Dealer Diagnostic diskette. After the menu appears pick selection "F" for the DISK TEST.

C. Remove the Dealer Diagnostic diskette and insert the Alignment diskette CALL 50688 (RETURN).

D. Select the AZIMUTH test from the disk test submenu.

E. Adjust the oscilloscope so that a steady display is shown. The display should look similar to those shown in Figure 1. The display labeled A. is the ideal condition, however the other three displays are also acceptable. If the drive produces a display with the first or fourth bursts larger than the second or third, the drive does not have an acceptable azimuth reading.

****NOTE:** THIS IS A GO - NO GO TEST. IF ACCEPTABLE AZIMUTH IS NOT DISPLAYED, THE DRIVE SHOULD BE RETURNED TO FRANKLIN COMPUTER CORPORATION.

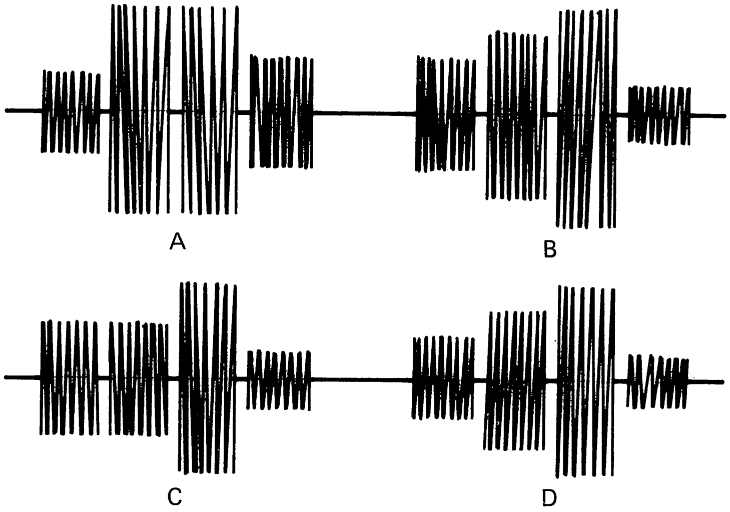

Figure 1. ACE 10 Floppy Disk Azimuth Test.

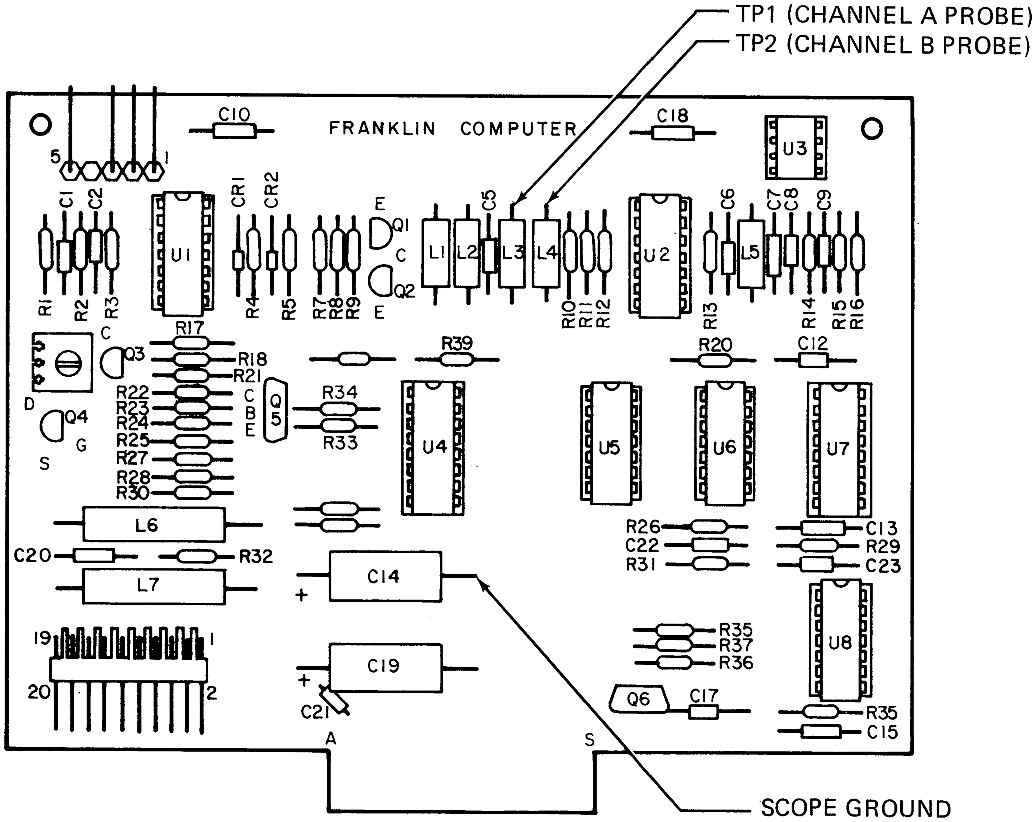

Figure 2. ACE 10 Disk Analog Board

5. TRACK ALIGNMENT

A. If you have already booted the Dealer Diagnostic diskette for the Azimuth test hit ESC key to bring up the disk submenu. If you are starting with this test you will have to boot the Dealer Diagnostic.

B. Select the ALIGNMENT test from the disk submenu.

C. Remove the Dealer Diagnostic diskette and insert the Alignment Diskette.

D. Hit the slash key (/) to go to track 10 on the alignment disk.

E. With the scope probes connected as for AZIMUTH TEST adjust the scope to give a steady display of at least two lobes as shown in figure 3. A time base of 10 msec/div will usually give the proper display.

F. The optimum display is shown in figure 3B where both lobes are of equal amplitude. If one lobe is smaller and is not within 80% the size of the larger lobe, an adjustment will be necessary.

With the drive still running, carefully turn the disk drive on its side. Locate the two slotted screws holding the stopper motor to the chassis of the drive aand loosen them slightly. While observing the oscilloscope display, rotate the stopper motor carefully until the two lobes are equal in size. Tighten the two screws and observe that the tow lobes are still the same size. Loosen and adjust as necessary.

Check the alignment by first pressing the right arrow key and then the left arrow key. If the lobes are still not within 80% of each other the drive will have to be realigned and checked again. It may be necessary to split the difference in the error to remain within the 80% limit. The final oscilloscope display should look like figure 3B.

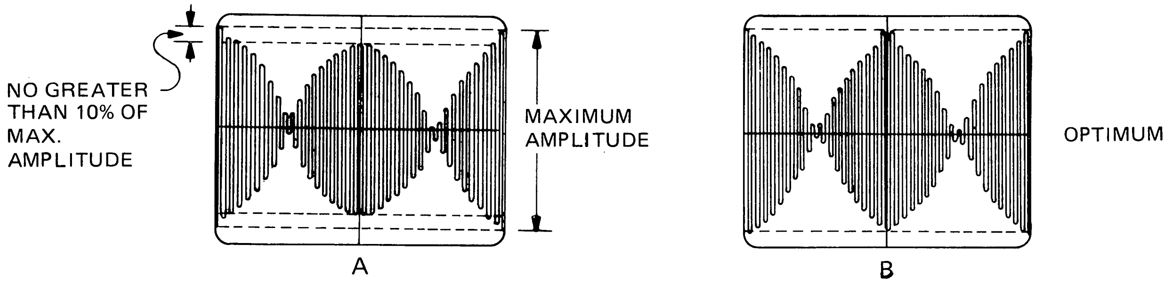

Figure 3. Track Alignment.

6. TRACK ZERO STOP

A. Remove the disk drive analog card and set it aside.

B. The proper setting can be verified by rotating the actuator cam until the motor shaft stop and the carriage limiter are touching. At this position, the relationship of the cam follower to the zero detent should be as shown in figure 4B.

C. If the actuator cam does not stop in the correct position loosen the adjustment screw on the carriage limiter and move the carriage limiter until the correct relationship between the actuator cam and cam follower are obtained. Tighten the adjustment screw and recheck for proper adjustment.

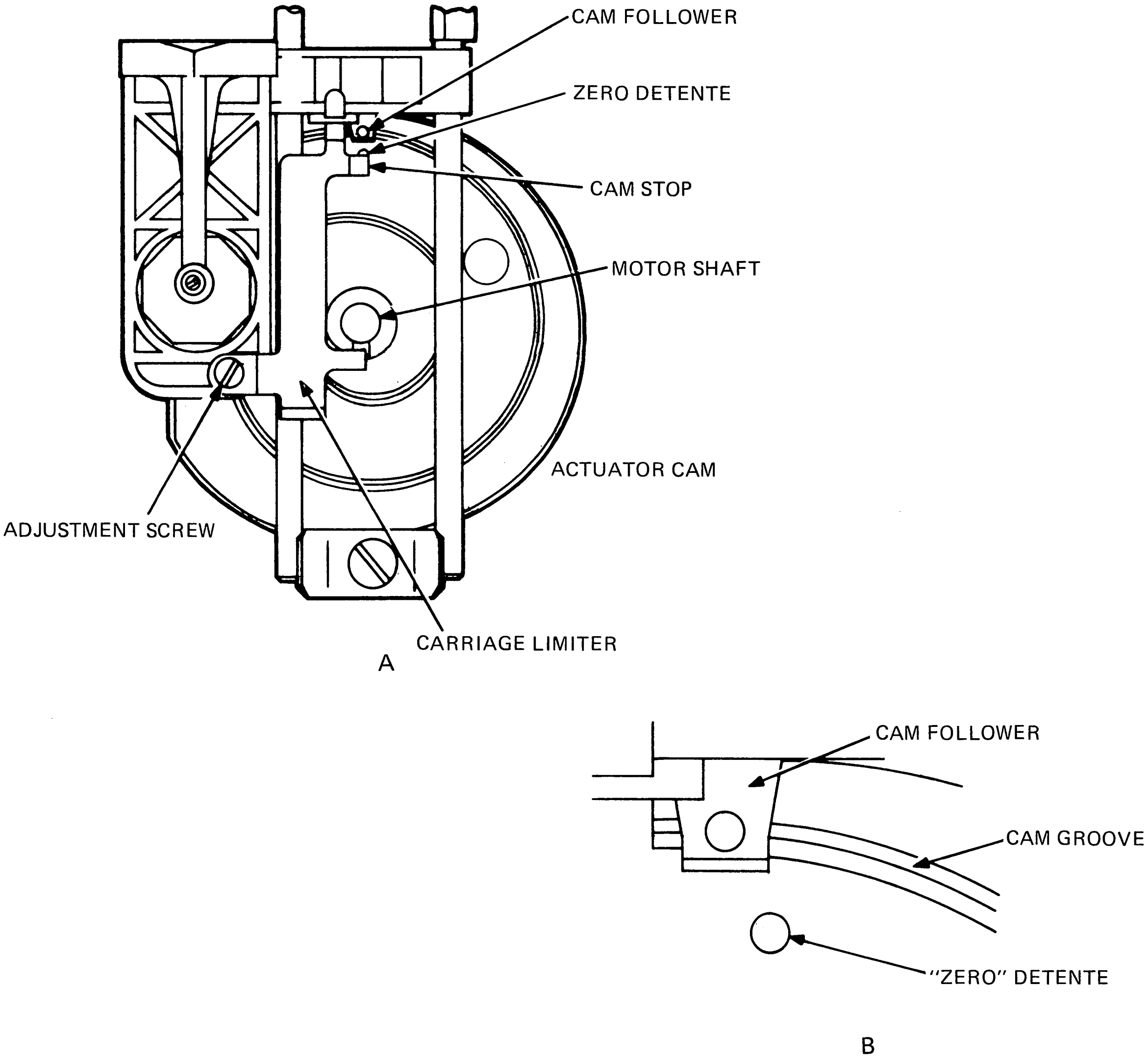

Figure 4. Track Zero Stop.

7. WRITE CURRENT ADJUSTMENT

A. Hardware required.

1. Computer, disk drive, monitor & controller card interfaced for normal operation.
2. Oscilloscope and ground.
3. Current probe and ground.
4. Extra 13/16 sector jumper.
5. Optional: Head assembly to be used as jig to test.

B. Procedure

1. Set up scope and probe to measure 6.8 ma.
2. Of the four wires coming from the R/W head, the red and black must pass through the current probe end in opposite directions as the wires come from the head.
3. 13/16 sector jumpers on the controller must both be jumped.
4. The scope must be set to fit the requirements of the particular probe being used.
5. Power up computer. Floating point cursor will appear on at the top of the screen. The drive will not spin as in usual operation.
6. Key in the command, call 50688 and hit RETURN. The pound sign (#) and the cursor will appear on the screen.
7. Key in "R" and hit RETURN, the drive will spin and the pound sign (#) and cursor will appear again.
8. Key in "AAW" and hit RETURN, the drive will keep spinning and the current wave will appear on the scope.
9. Adjust the blue pot on the top of the analog card until the scope measures 6.8 ma.

8. ALTERNATE WRITE CURRENT ADJUSTMENT

HARDWARE REQUIRED:

1. Computer, Disk Drive, Controller, & Monitor.
2. Digital Voltmeter (Fluke 8021 B Multimeter)
3. 13/16 Sector Jumper

PROCEDURE:

1. Adjust voltmeter settings to read 2 volts on the DC voltage scale.
2. Ground voltmeter at (-) end of the C14 capacitor on the analog board. Figure 5
3. Both 13 & 16 sector selectors should be jumpered on the disk controller card. See Figure 6
4. Power up the computer, floating point cursor will appear at the top of the screen. (Drive will not spin as in usual operation).
5. Key in the command - Call 50688 - and hit return. A pound sign (#) will appear on the screen.
6. Key in - R - and hit return. The disk drive will start spinning and the pound sign and cursor will appear again.
7. Key in -AAW- and hit return. (Drive will continue spinning).
8. Place the voltmeter probe on pin 3 of the UI IC (CA34054) on the disk analog board.
9. Adjust the blue pot on top of the analog card until the voltmeter scope reads as close to 1.240 as possible without going over 1.240 V.

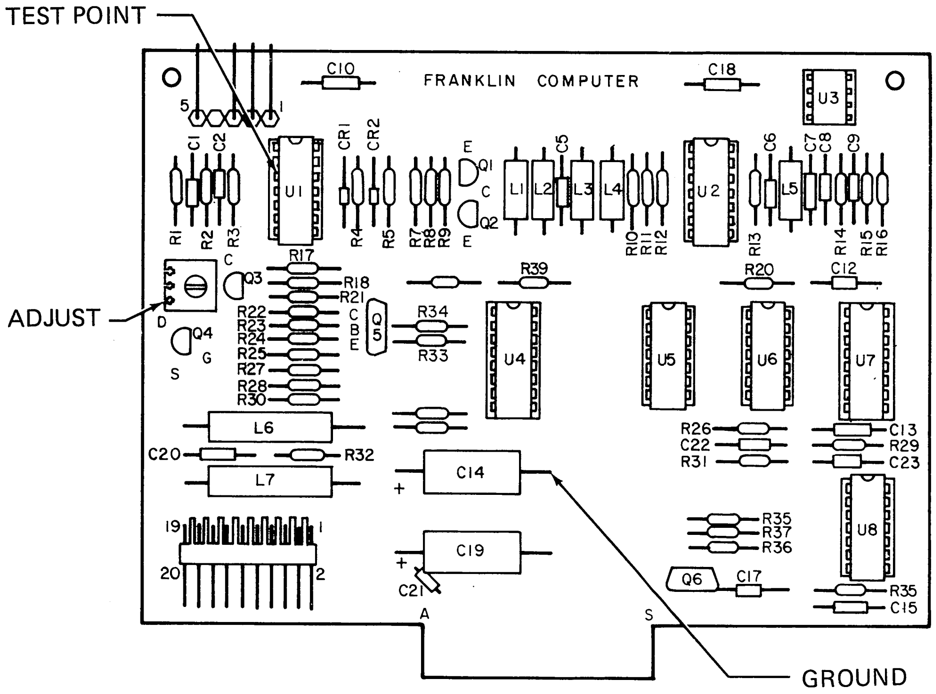

Figure 5. ACE 10 Disk Analog Board.

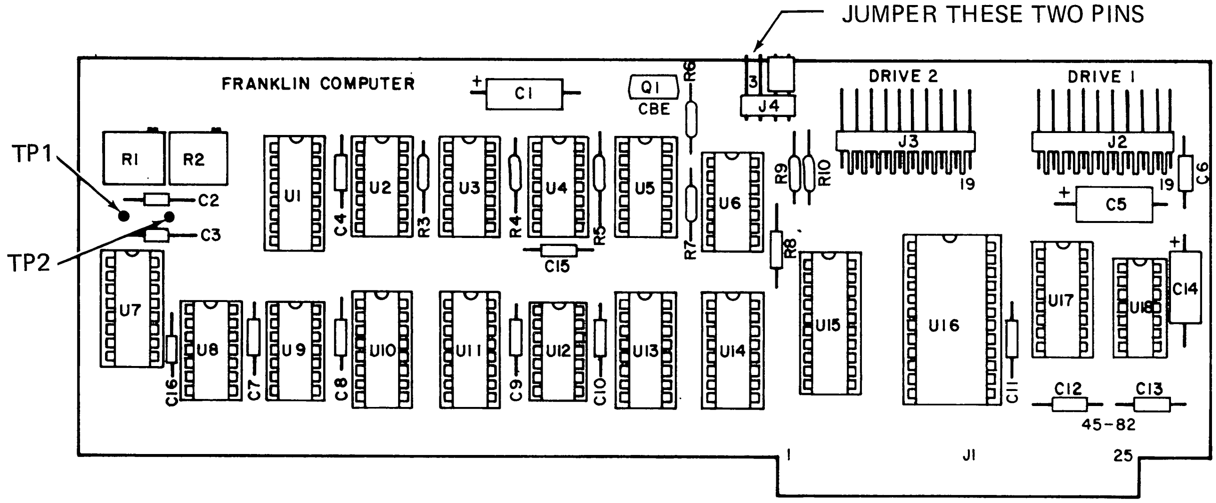

Figure 6. ACE 10 Disk Controller.

9. DISK MOTOR SPEED ADJUSTMENT

The disk drive motor speed can be adjusted in two ways. The speed can be set by visually observing the timing disk on the bottom of the drive under flourescent lighting, or it can be set with the use of the Dealer Diagnostic Diskette.

A. VISUAL ADJUSTMENT

Position the drive so that the strobe disk on the bottom can be seen (you must be in an area lighted by fluorescents for this procedure to be effective).

Do not install a disk in the drive and turn on the power, this will allow the drive to spin while you make andy speed checks or adjustments.

Adjust the pot on the small PC board mounted on the rear of the disk drive using a small flat screwdriver. Turn the pot until the outside band of dark lines appears motionless.

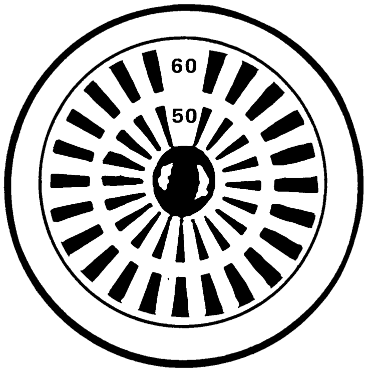

Figure 7. Disk Strobe Wheel.

B. DEALER DIAGNOSTIC SPEED ADJUSTMENT

Install the Dealer Diagnostic Diskette in the disk drive and reset the computer to boot the diskette. The monitor screen will clear and display the diagnostic menu. Select the disk test from the menu. A secondary disk menu will then be displayed. Select the speed test from the secondary menu. The drive under test will activate and the speed of the drive, in milliseconds, will be displayed. Adjust the pot on the rear of the disk drive for a displayed setting of 200 ms. The tolerance is + or - 1 ms.

10. R1, R2, CONTROLLER TEST

Connect a disk drive to the drive 1 position of the disk controller. Jumper the two left pins of J4 together (SEE FIGURE 8). Do not disturb the two right pins. They must also be jumpered together.

Insert initialized diskette.

Apply power to the computer. The computer will initialize and the floating point basic prompt will be displayed.

Type the following:

```
CALL 50688 (RETURN)
AAW (RETURN) (ESC)
```

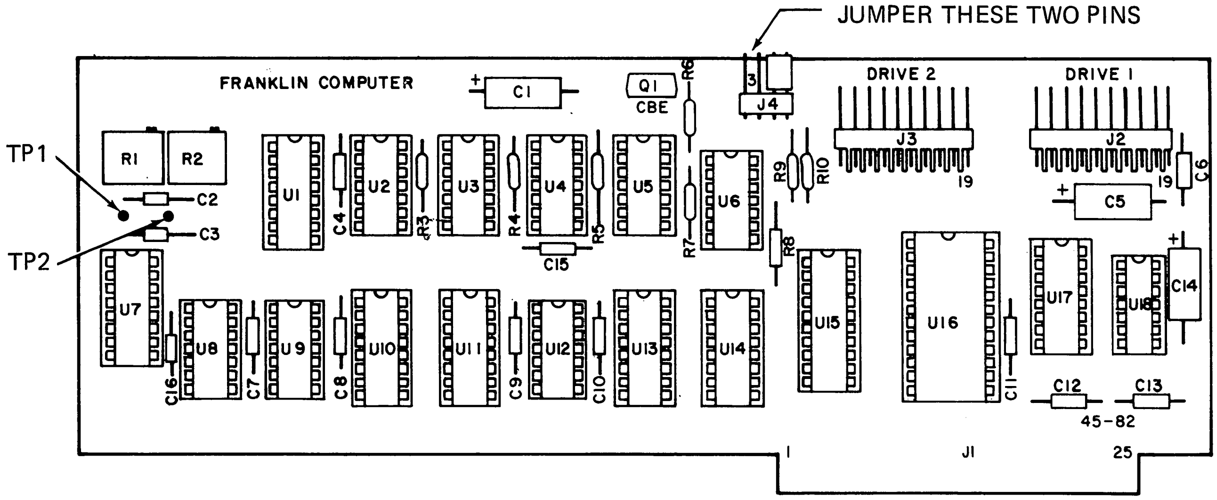

Figure 8. ACE 10 Disk Controller.

Connect the oscilloscope A channel probe to TP1 on the disk controller. Adjust R1 on the disk controller for a pulse width of 5.4 micro seconds.

Type the following:

```
99W (RETURN)
```

Connect the oscilloscope A channel probe to TP2 on the disk controller. Adjust R2 on the disk controller for a pulse width of 3.8 micro seconds.

11. R/W VERIFY TEST

This test should be performed after a disk drive has been adjusted to verify that it is in good working condition.

1. Install DEALER DIAGNOSTIC diskette and boot-up.
   Pick DISK TEST (F) from menu.
2. When the DISK DIAGNOSTICS menu appears pick R/W VERIFY. (F).
3. Remove DEALER DIAGNOSTICS and insert initialized diskette.
4. Press return to start test.

If the test can make one or more passes with no errors the drive unit is in proper working condition.

FRANKLIN
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7030 Colonial Highway
Pennsauken, NJ 08109
609-488-1700

To: All Servicing Dealers

From: Richard C. Ruhland

Subject: Service Center Problems

Date: September 29, 1983

We have been experiencing some problems in processing your repairs which I think could be reduced very easily. We want to be able to repair and return your service units as soon as possible but we need certain information on the DMT that is not always included.

Most of the problems relate to warranty/non-warranty status and the lack of supporting data for items submitted as warranty claims. The major points which need your attention are:

> -Warranty status: When you submit work to us which should be treated as warranty we must have supporting data (date of purchase and serial number). If there is no supporting data we will handle the repair as non-warranty to prevent delays.
>
> -Stripped boards: Some dealers seem to be using our repair center as a means of replenishing their stock of chips by returning boards with large quantities of chips missing. This practice causes us additional work and slows down our normal repair cycle. This is not a typical failure and will be handled as a non-warranty repair regardless of when the board was purchased.
>
> -Store Stock: We have been handling many items as non-warranty repairs which were not properly documented as warranty and then receiving letters from the dealer requesting credit because the item was store stock. This only creates more work for both of us. If the item is store stock please indicate this on the DMT.

If there are any areas which you feel need to be addressed by us here at Technical Services, please feel free to contact me.

Richard C. Ruhland

Richard C. Ruhland
National Service Centers Manager

Proper Use of the Monthly In-Warranty Report

This form is to be used solely as a transmittal for your monthly warranty claims. We require a seperate Service Report for each claim you submit. The "Monthly In-Warranty Report" simply functions as a transmittal and summary of your claims.

Warranty Claims

Many claims are being returned to you because they are incomplete. Specifically, Customer's Names and Addresses are being left off. Date of purchase, model and serial numbers are often missing. As an absolute minimum we require the following information for each claim:

1. Service Center Number
2. Your Company Name and Address
3. Customer Name and Address
4. A discrete Claim Number for each claim
5. Model and Serial Number
6. Date of Purchase
7. Date Repaired
8. Defect to be repaired
7. Work performed
8. Quantity, Part Number and Description of all parts used.
9. Defective Material Tag Number in those instances in which you replace a module and return it to Frankln for repair.

Some of the claims received are several months old. **We cannot accept for, reimbursement, any claims more than forty-five (45) days old.** Please, make a point of submitting your claims on a monthly basis in order to make certain you do not miss out on the income to which you are entitled. **Refer to Bulletin PRO-002 of Franklin's Technical Reference for guidance in presenting your claims.**

Do not include your Warrranty Claims with units being returned for repair. Submit them under separate cover to Warranty Administration. Otherwise, they may become lost in the Receiving Area.

Return of Defective Material

Presently, we require that you return all defective Fans and Eproms to us for credit. We do not require the return of chips and LEDs.

If you have any questions on filling out your Warranty Claims, please do not hesitate to call Warranty Administration for assistance. Thank you.

Listed below are the items you should have in this package. All of the information will go in the first half of your Technical Reference Manual.

Some of the following items are revisions of current bulletins. Be sure to remove the old bulletin before inserting the new ones. Place the new bulletins in the locations noted.

	CHANGE	LOCATION	# OF PAGES	STATUS
1.	Copyright Information	Front of Manual	1	Change
2.	Registration Form	Front of Manual	1	Change
3.	Table of Contents	Front of Manual	3	Change
4.	Bulletin # GEN-001.1	Section 1	2	Change
5.	Bulletin # PRO-001.1	Section 2	2	Change
6.	Bulletin # PRO-002.1	Section 2	2	Change
7.	Bulletin # PRO-003.1	Section 2	2	Change
8.	Bulletin # PRO-004.1	Section 2	1	Change
9.	Bulletin # WAR-001.1	Section 3	4	Change
10.	Bulletin # NWA-001.1	Section 4	3	Change
11.	Bulletin # INV-002.1	Section 5	1	Change
12.	Bulletin # INV-003.1	Section 5	1	Change
13.	Bulletin # INV-004	Section 5	1	New
14.	Bulletin # DPA-001.1	Section 6	4	Change
15.	Bulletin # RPA-001.1	Section 7	4	Change
16.	Bulletin # ACI-006	Section 8	10	New
17.	Bulletin # ACI-007	Section 8	1	New
18.	Bulletin # DSK-002.1	Section 11	11	Change
19.	Parts Discount Flyer	None	1	New
20.	Policy Clarification	None	1	New
21.	Service Memo	None	1	New

1983 by Franklin Computer Corporation
2128 Rt 38
Cherry Hill, N.J. 08002
609 482-5900

This manual is copyrighted. All rights are reserved. This document may not, in whole or part, be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine readable form without prior written consent, from Franklin Computer Corporation.

This manual has been prepared to address two distinct and separate purposes. The first area of the manual, currently consisting of 15 Sections, contains the full range of information needed for an Authorized Service Center to fulfill its function. The second area of the manual contains the self training work sessions used in the Dealer Service Training Course. Both areas of the manual should prove useful in the day to day operation of your Service Center.

We welcome any suggestions or comments on the layout and content of this manual. These may be sent to the above adress, ATTN: Technical Services Department.

NAME

COMPANY NAME

ADDRESS

CITY, STATE, ZIP

PHONE #

SERVICE CENTER #

CLASS LOCATION

CLASS TITLE

DATE OF CLASS

PURPOSE

SECTION 1 - COMPONENTS

SECTION 2 - MOTHERBOARD LAYOUT

SECTION 3 - ACE 1000 DISASSEMBLY/REASSEMBLY

SECTION 4 - ACE 1200 SYSTEM

SECTION 5 - DISK 1 (MECHANICAL)

SECTION 6 - DISK 2 TESTS AND ALIGNMENTS
(OPTIONAL ALIGNMENTS)

SECTION 7 - OPERATING SYSTEMS

SECTION 8 - DIAGNOSTICS

SECTION 9 - TROUBLESHOOTING

COMMENTS AND QUESTIONS:

SIGNATURE:

TITLE:

FRANKLIN COMPUTER CORPORATION
2128 RT 38
CHERRY HILL, N.J. 08002

609 482-5900

DEALER SERVICE MANUAL

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TECHNICAL INFORMATION BULLETIN

FRANKLIN
COMPUTER CORPORATION
7030 Colonial Highway
Pennsauken, NJ 08109
609-488-1700

BULLETIN #: GEN-001.1 DATE: 09/01/83
SUBJECT: FCC Service Center

1. OBJECTIVES

The Franklin Computer Corporation Customer Service Program is intended to provide a range of services to the dealer network and through the dealers, to the end user of the ACE Computer. These services include the following:

A. Technical training on the full line of Franklin Computer products.

B. A repair parts complement which will enable the dealer to properly service the population of ACE Computers and peripherals in his service area.

C. Administrative tools and services which are necessary to provide quality service to the end user.

D. A Warranty Program which will allow the dealer to make a good profit on his warranty service.

E. A Non-Warranty Program which will allow the dealer to make a good profit on his non-warranty service.

In addition to these services, Franklin Computer Corporation will provide information, suggestions, and any other assistance which will help the dealer gain additional profits for his service operation and also provide the best possible service to the ACE Computer end user.

2. DEFINITION OF AUTHORIZED SERVICE CENTER

The Franklin Computer Corporation Authorized Service Program is designed to operate in two phases as follows:

A. Local Service Center - The Local Service Center is to be the normal contact for an end user. Emphasis is to be placed on speed and quality of service. Repairs are generally to be made by module replacement. Alignments and adjustments on some assemblies will also be made.

B. Regional Service Center - The Regional Service Center will be the normal contact for the Local Service Center. Parts and modules will be stocked and will be provided to the Local Service Center on an exchange or purchase basis. A technical hot line will be available for use by the dealers' technical staff. Currently the only depot level service centers are those operated directly by Franklin Computer Corporation.

3. QUALIFICATIONS AND REQUIREMENTS FOR A LOCAL SERVICE CENTER

All ACE Computer Dealers are required to become Authorized Service Centers in order to insure quality and responsive sales and service to the end user. The Dealer will be notified by the Technical Services Department on the training schedule in the nearest Regional Service Center. The requirements for the completion of this training and certification as an Authorized Service Center are as follows:

A. At least one person per Authorized Service Center location must attend a technical training class on the ACE Computer and accessories. Schedules for these classes will be published as necessary.

B. Purchase the Authorized Service Center spare parts complement. This spare parts kit will include module level replacements, component level replacements, Dealer diagnostics diskettes, and an Authorized Service Center Procedures Manual. A detailed list and prices of the spare parts kit is listed in Section 5.

C. Additional spare parts kit purchases may be required if the Dealer is authorized for sales of future Franklin Computer Products.

4. AUTHORIZED SERVICE CENTER NUMBER

On appointment as a Local Service Center, a dealer will be assigned a service center number. This number will be used when applying for warranty service compensation, returning modules for repair or replacement, and any interface between the dealer and Franklin Computer Corporation Customer Service Department. The proper use of this number will insure the timely reimbursement to the dealer on warranty repairs and the shipment to the dealer of replacement modules.

TECHNICAL INFORMATION BULLETIN

FRANKLIN
COMPUTER CORPORATION
7030 Colonial Highway
Pennsauken, NJ 08109
609-488-1700

BULLETIN #: PRO-001.1 DATE: 09/01/83
SUBJECT: Warranty Service Report

---

1. WARRANTY SERVICE REPORT DEFINITION

The Franklin Computer Corporation Warranty Service Report is the only form used for initiating warranty compensation for the authorized ACE dealer. Information developed from the document also allows Franklin to track failure rates of various products to determine potential problem areas and to forecast resource needs. The information is also used to audit the quality of service provided by the ACE Dealer. Therefore the customer name, full address, date of purchase, model and serial number must be provided on the form. Proper use of this document by the dealer is essential in fulfilling these requirements.

A sample of the Monthly In-Warranty Service Report is shown on the next page.

2. COMPLETING THE REPORT

In order to assist Franklin Computer Corporation in properly administering the warranty program, it will be the Dealer's responsibility to:

A. Submit fully documented claims

B. Submit totally accurate claims

C. Submit claims on a timely basis

Forms are to be completed monthly and submitted to Franklin Computer Corporation no later than the 5th of the following month. Claims received after that date will be processed the in the next monthly period. Claims are to be sent to:

Franklin Computer Corporation
2128 Route 38
Cherry Hill, N.J. 08002

ATTN: WARRANTY ADMINISTRATION

3. DOCUMENTATION OF CLAIMS

To be eligible for payment, all in-warranty labor claims must be supported as follows:

A. A copy of the Service Center's Repair Report should be submitted with the claim form.

B. A copy of the purchaser's sales receipt for the unit being repaired or confirmation from FCC Warranty Administration that the warranty is valid. This can be obtained by telephone if necessary.

TECHNICAL INFORMATION BULLETIN

FRANKLIN
COMPUTER CORPORATION
7030 Colonial Highway
Pennsauken, NJ 08109
609-488-1700

BULLETIN #: PRO-002.1
DATE: 09/01/83
SUBJECT: Parts Order Procedure

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1. OVERVIEW

Modules used by the Service Center during the course of warranty repair are exchanged by Franklin Computer Corporation for new or working repaired units.

Discrete parts used for warranty repairs are credited to the Service Center's account at Dealer net cost. These credits are based on information submitted by the Dealer on the Monthly In-Warranty Service Report.

There will be occasions when a Dealer will find it necessasry to purchase modules and parts in order to:

A. Increase the Dealer's stock in hand.

B. Replace a module which has been damaged so as to not qualify for the module exchange program.

C. Replace parts sold to an end user.

Parts orders should be made on the Service Center's Purchase Order or stationery. The order should be dated and signed by one of the Dealership Principals.

The minimum dollar value for a parts order is twenty five dollars ($25.00) at Dealer net.

2. PARTS ORDERING INFORMATION

The information outlined below is required for proper processing of parts orders.

A. DATE - The date the order is submited to FCC.

B. ORDER NUMBER - All parts orders should have either a purchase order number or reference number for identification.

C. SERVICE CENTER NUMBER - This is the unique number assigned to your Service Center. Be certain to use the correct number on this and any other document or correspondence submitted to Franklin Computer Corporation for service or parts purposes.

D. SOLD TO AND SHIP TO - The Service Center name and shipping address for this order.

A complete listing of parts and modules available with dealer pricing can be found in Section 6 of this manual.

TECHNICAL INFORMATION BULLETIN

FRANKLIN
COMPUTER CORPORATION
7030 Colonial Highway
Pennsauken, NJ 08109
609-488-1700

BULLETIN #: PRO-003.1 DATE: 09/01/83
SUBJECT: Defective Material Tag

Modules returned to a Franklin Computer Corporation Regional Service Center must have a properly filled out Defective Material Tag attached. Failure to provide the necessary information may prevent the Regional Service Center from determining which Local Service Center the item came from or the proper disposition of the unit.

Warranty compensation will not be made from the Defective Material Tag. The exclusive use of the tag is to control the flow of parts and modules between the Depot and the Local Service Center. Warranty compensation is determined from the information provided on the Warranty Service Report. Use of that report is explained in Bulletin # PRO-001.

The layout of the Defective material tag is shown on the following page and a detailed explanation of each item in the tag is as follows:

A. Date - The date the repair was accomplished.

B. Service Center Name - The service center name as registered with Franklin Computer Corporation.

C. Local Service Center Number - The number assigned to your service center. Use care in the use of this number. An unreadable or incorrect number may result in the replacement module being sent to the wrong service center.

D. Customer Name

E. Service Center telephone number

F. Model Number - The model number of the parent unit, as in Franklin ACE 1000.

G. Serial Number - The serial number of the parent unit.

H. Assembly Number - The product number of the assembly being returned. These product numbers are listed in the service center spare parts kit, Bulletin # INV-002.

I. Assembly Serial Number - The serial number of the assembly being returned.

J. Type of Service - Indicate type of service provided. Possible types of service are:

   a. Warranty
   b. Non-warranty exchange
   c. Non-warranty repair and return
   d. DOA store stock

   If Warranty Service, the purchase date must be shown to qualify the module for the exchange program. If this date is not provided, the replacement module will be shipped as a non-warranty exchange.

K. Problem - Describe the problem in as much detail as possible. Indicate diagnostic failures if applicable and configuration of machine.

If you are returning a module from a DOA stock unit, be sure to note that in the TYPE OF SERVICE box and list the date the unit was received from Franklin Computer Corporation or a distributor.

The Defective Material Tag is supplied as a single part form. The removable tag is for your record of shipment while the remaining part is to be attached to the defective module with the string provided.

TECHNICAL INFORMATION BULLETIN

FRANKLIN
COMPUTER CORPORATION
7030 Colonial Highway
Pennsauken, NJ 08109
609-488-1700

BULLETIN #: PRO-004.1 DATE: 09/01/83
SUBJECT: MODULE RETURN PROCEDURE

MODULE RETURNS

1. Use an exchange module from your dealer spare parts kit to effect the necessary repair on the ACE computer.

2. Fill out the Defective Material Tag as explained in Bulletin # PRO-003. Be certain this tag is properly filled out. Failure to do so could result in the Regional Service Center not shipping an exchange module to replace the unit you used. Attach the tag securely to the defective module. Remove the tag stub for your record of shipment. The primary portion of the tag will be retained by the Regional Service Center.

3. Pack the defective module in the box the exchange module was removed from.

4. Ship the defective module to:

   Franklin Computer Corporation
   1165 Busch Memorial Highway
   Pennsauken, N.J. 08100

   ATTN: TECHNICAL SERVICES DEPT.

Customer Service Department policy requires priority shipment on exchange modules. We will in most cases ship replacements within 48 hours after receiving a defective module in the Regional Service Center. If do not receive your exchange module in a reasonable time, call Customer Service to check on the status of the unit. Please have available your service center number and the Repair/Return Tag number to expedite tracing of the unit.

Warranty compensation is not made from the module replacement program. This program is used exclusively to control the parts flow between the Regional Service Center and the Local Service Center. Warranty reimbursement is made through the information provided on the Service Report. See Bulletin # PRO-001 for additional information on this process.

TECHNICAL INFORMATION BULLETIN

FRANKLIN
COMPUTER CORPORATION
7030 Colonial Highway
Pennsauken, NJ 08109
609-488-1700

BULLETIN #: WAR-001.1 DATE: 09/07/83
SUBJECT: Warranty Policy and Procedures

1. OVERVIEW

The Franklin Computer Corporation Service Plan is designed to provide the following benefits:

A. An extensive network of Authorized Service Centers whose objective is to provide responsive local service to the Franklin computer user.

B. Fair compensation to the Authorized Service Center for his efforts in providing warranty service.

C. Fair compensation to the Authorized Service Center for his efforts in providing non warranty service.

2. INTRODUCTION TO THE WARRANTY PROGRAM

All Franklin Computer Corporation products are sold with a 90 day warranty to the end use purchaser. This warranty coverage begins as of the date of purchase from an authorized Franklin dealer. See figure 3.1 for a full description of the warranty as it is stated on the registration card.

3. PROOF OF WARRANTY

The recommended method of determining if a product is in warranty is the customer's purchase record. This should be in the form of a dated receipt from an authorized Franklin dealer. If the customer cannot provide such a receipt, the dealer can call the Franklin Computer Corporation Customer Service Department to determine if the product has been registered. If the purchase date cannot be verified by either method, the repair should be handled as an out-of-warranty repair to be paid by the customer.

Since dealer warranty claims are checked against warranty card registrations, we suggest that the dealer retain a copy of the proof of purchase. If a dealer's warranty claim is rejected by Franklin Customer Service, a copy of the customer's proof of purchase may be accepted for warranty claims.

4. WARRANTY REGISTRATION

All Franklin Computer products are shipped with a Warranty

Registration Card which defines the extent of warranty coverage. This card is shown in figure 3.1.

The dealer should have this card filled out by the customer prior to completing delivery of the Franklin product. If possible, the dealer should mail the card at that time to insure proper registration of the product. Do not expect the end user to fill out and mail the card without your follow up.

The purchase receipt provided to the customer should be dated and should list serial numbers of any Franklin products. Remember that this receipt will usually be the method used in determining if a product is still in warranty.

5. PRODUCTS COVERED

All products manufactured by Franklin Computer Corporation and labeled as such with a serial number tag and/or logo. Current products include the following:

A. ACE 1000/1200 including all internal modules

B. ACE floppy disk subsystem including controller

C. Repair modules installed by a Franklin Computer Corporation Authorized Service Center are covered for a period of 90 days from the date of installation by the repair center. Modules installed by the end user or a non authorized dealer are not covered by this warranty.

6. EXCLUSIONS FROM WARRANTY

The following products and conditions are not covered by the Franklin Computer Corporation warranty:

A. Any product not manufactured by Franklin. This includes but is not limited to I/O and peripheral cards and accessories interfaced to the ACE by either the dealer or the end user.

B. Damage to or failure of a Franklin product caused by a non Franklin product.

C. Damage to or failure of a Franklin product caused by variations in input power.

D. Damage to or failure of a Franklin product caused by environmental conditions not consistent with Franklin Computer Corporation published requirements. This includes excess heat, cold, humidity or any other condition deemed to be detrimental to the operation of Franklin Computer Corp. equipment.

E. Damage to any component or assembly due to improper installation or removal of any device within or interfaced to a Franklin Computer product. This includes but is not limited to damage to a disk drive or controller due to removal or installation with the power applied to the computer.

F. Unauthorized modifications of any kind are not only not covered by warranty but will cause any remaining warranty on the product in question to be voided.

G. Damage to or failure of any Franklin product due to software not provided by Franklin Computer Corporation.

H. Damage to or failure of any Franklin product due to accident, misuse, or misapplication of the product.

7. WARRANTY REIMBURSEMENT POLICY

Only athorized Franklin Computer Corporation service centers will receive reimbursement for any work performed on a Franklin product during the defined warranty period.

Reimbursement will be based on a flat rate for each type of repair as defined in the rate schedule as listed in this Bulletin. Please note that this rate is clearly defined and is not flexible or variable for the number of hours required for the repair. The service policies of Franklin dictate that repairs be accomplished by isolating a problem to the modular level in most cases and replacing that module. This policy is intended to minimize the time required to effect a repair, thus saving the customer time and the dealer excess labor costs.

The mechanism used to calculate refunds due each dealer is the Warranty Service Report. See Bulletin # PRO-001 for an explanation of the proper use of this document.

8. WARRANTY REIMBURSEMENT SCHEDULE

Authorized Service Centers will be compensated for work performed on Franklin ACE products during the defined warranty period. The compensation schedule for each type of service is as follows:

A. DIAGNOSIS AND MODULAR, IC, OR COMPONENT REPLACEMENT

This includes testing and replacement of any module level unit or component level unit as defined in the dealer parts list. Compensation is $30 per service session.

B. DIAGNOSIS AND ALIGNMENT

This includes tests and alignments on disk drives and controllers. Compensation is $20 per service session.

C. REPLACEMENT OF CABLES, LAMPS, OR OTHER PARTS

This includes disk or computer cables, lamps or L.E.D.'s, key tops or key switches. Compensation is $15 per service session. (Re-seating of components or cable connections are not included).

9. MODULE REPLACEMENTS

Module level products used by a dealer in the performance of a warranty repair will be replaced by FCC on receipt of the defective module at the FCC Customer Service Department. See Bulletin Numbers PRO-003 and PRO-004 for proper use of the Defective Material Tag and for module return procedures respectively.

10. MISCELLANEOUS PARTS REPLACEMENTS

ROM ICs and Fan Motors must also be returned to FCC as a module level product. However these and all other component items will be credited to the Dealer's account based on the usage indicated on the Monthly In-Warranty Service Report.

NOTE: ALL PARTS USED FOR IN-WARRANTY REPAIRS SHOULD APPEAR ON BOTH THE DEALER'S SERVICE REPORT AND THE MONTHLY IN-WARRANTY SERVICE REPORT.

For a complete list of parts and modules with pricing, see Section 6, DEALER PARTS LIST. The minimum acceptable parts order is twenty five dollars ($25.00) dealer net price.

TECHNICAL INFORMATION BULLETIN

FRANKLIN
COMPUTER CORPORATION
7030 Colonial Highway
Pennsauken, NJ 08109
609-488-1700

BULLETIN #: NWA-001.1 DATE: 08/30/83
SUBJECT: Non-warranty Policies

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1. DEFINITION AND POLICY

The normal warranty period for products manufactured by Franklin Computer Corporation is 90 days from the date of purchase from an authorized FCC dealer. An exception to this policy is the ACE 10 Disk System which warranted for a period of one year following date of purchase. Service provided after the expiration of this period must be paid by the end user at the current rates then for the time and materials used.

While labor rates are to be determined by each individual Service Center, suggested rates are listed in paragraph 2 below. Module replacements are generally done on an exchange basis, giving a trade in value to the end user for the defective module. Module exchange rates are listed in paragraph 6. Trade in value is not given to component replacements, mechanical replacements, or items considered consumable such as lights, fuses, etc. These items should be sold by the Service Center at list price. Section 6 lists these items with the dealer and retail prices.

FCC Authorized Service Centers will be responsible for providing non-warranty service to purchasers of FCC products. This is of benefit to the Authorized Service Center in that it is a revenue generating activity which will more fully utilize the technical capabilities of the Service Center.

2. LABOR RATES

Labor rates will vary significantly depending on the location of the Service Center and other factors. We have provided below what we have found to be acceptable and normal labor rates for major metropolitan areas. You may use these as a guideline if you wish.

A. IN SHOP REPAIRS

Diagnostics and testing with no replacements	$25.00
Module or component replacement	30.00
Disk drive testing and adjustment	30.00
Minor component or cable replacement	20.00

B. REPAIRS AT CUSTOMER LOCATION

$60.00 per hour with a 1 hour minimum charge plus expenses at $.28/mile, tolls and parking. For locations in excess of one hour travel time of the Service Center, travel time at the rate of $20/hour.

These labor charges should be in addition to any charges for parts or modules used.

3. EXCHANGE MODULES

Modules replaced by a Service Center will be accepted by FCC for exchange for a good module of the same type if the defective module meets two conditions as follows:

A. The module must not have been modified by the end user or dealer in any way not authorized by FCC.

B. The module must be repairable. If damage to the module is excessive, causing repair not to be feasible, it will not be treated as a replaceable unit. The end user must purchase a new module in this event. For wholesale and retail pricing on sales of modules and parts, see Section 6 of this manual.

If modules or entire units do not qualify for exchange or normal repair due to unauthorized modifications or damage as noted in paragraph b. above, the units will be returned to the dealer or repaired on a time and materials basis at the Dealer's option.

Following is a list of exchange modules with dealer and end user pricing:

ACE 1000/1200

PART #	DESCRIPTION	DEALER PRICE	RETAIL PRICE
1100018-10	MOTHERBOARD, COLOR	$171.00	$285.00
5018500	KEYBOARD, ACE 1000	53.10	88.50
5018506	KEYBOARD, ACE 1200	53.10	88.50
1200009	POWER SUPPLY	63.52	105.87
1100002	16K RAM CARD	30.67	51.00

ACE 10 SYSTEM

PART #	DESCRIPTION	DEALER PRICE	RETAIL PRICE
1100004	DISK ANALOG CARD	32.40	54.00

4018003	DISK CONTROLLER	$ 26.60	$ 46.00
4018019	DISK MECHANICAL ASSY	90.00	150.00

PERIPHERAL CARDS

1100012	80 COLUMN CARD	57.00	95.00
1100015	Z80 CP/M CARD	112.20	187.00
1100013	DUAL I/O CARD	60.00	100.00
1100011	COLOR CARD	50.00	75.00

TECHNICAL INFORMATION BULLETIN

FRANKLIN
COMPUTER CORPORATION

This bulletin contains specific information on how to connect the following printers to the Franklin ACE Dual Interface Card:

TI 820 RO	(Serial)
Qume S9/45	(Serial)
NEC Spinwriter 3510	(Serial)
NEC Spinwriter 7710, 7715, 7720,7725	(Serial)
Okidata M93	(Parallel)
Epson FX-80, MX-80	(Parallel)
Smith-Corona TP-1	(Parallel)
C. Itoh Prowriter 8510	(Parallel)

The instructions tell you how to set printer control switches (or program the printer) and set switches on the ACE Dual Interface Card.

If you have a parallel printer, you can use the Franklin 5-foot parallel cable or any Centronics-type parallel cable without changing it. For some serial printers (the Qume, for instance), the Franklin 6-foot cable is suitable for operation at any speed. Both cables are available from your Franklin dealer.

If you want to operate other serial printers at high speeds (the TI and NEC, for instance), you'll need to build a custom cable to transmit certain signals from the printer to the Dual Interface Card. This bulletin tells you which lines your custom cable should connect. It also tells you how to select slower printer speeds if you don't want to make a special cable.

You'll find illustrations and more information in the Franklin ACE Dual Interface Card User Reference Manual.

Franklin has successfully connected the ACE Dual Interface Card to each of these printers using the instructions in this bulletin. However, Franklin does not control the design or manufacture of the printers, and therefore cannot unconditionally guarantee that these instructions will work for your printer, even if it is one of those listed above.

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TI 820 RO (serial printer)

Programming the Printer

Set the baud rate, half or full duplex, and parity using the programmable keypad on the front panel of the printer. For more details, follow the instructions provided by TI.

Dual Interface Switch Settings -- High Speed Operation

Example: Printer runs at 9600 baud, full duplex, and no parity:

Switch #	1	2	3	4	5	6	7	8
Switch Group 1	ON	OFF	OFF	OFF	OFF	OFF	OFF	
2	ON	ON	OFF	OFF	OFF	ON	OFF	
3	OFF	ON	OFF	OFF	OFF	ON	ON	OFF

To set the printer to a different baud rate or parity, refer to page 5-18 of the Franklin ACE Dual Interface Card User Reference Manual to find the appropriate settings for Switch Group 2. Use the settings listed above for Switch Groups 1 and 3.

Dual Interface Switch Settings -- Low Speed Operation

Example: Printer runs at 1200 baud, full duplex, and no parity:

Switch #	1	2	3	4	5	6	7	8
Switch Group 1	ON	OFF	OFF	OFF	OFF	OFF	OFF	
2	ON	ON	OFF	ON	OFF	OFF	ON	
3	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF

Cabling

You can operate your printer at low speed (1200 baud or less) with Franklin's 6-foot serial cable or any standard RS-232 cable.

But if you want to operate your printer at high speed (higher than 1200 baud), your cable must connect the pins listed below:

Dual Interface Card (DB-25 male plug)	Printer (DB-25 male plug)
2	2
3	3
20	11

PLUG THE DUAL INTERFACE CARD INTO SLOT 2 OF THE COMPUTER

NEC SPINWRITER 3510 (serial printer)

Printer Switch Settings -- High Speed Operation

Example: To select 1200 baud and no parity:

Set the tumble wheel marked "speed" on the front panel to 5. Set all switches on the front panel to the DOWN position.

If you want to use a different setting, follow the instructions provided with your printer.

Dual Interface Switch Settings -- High Speed Operation

Example: 1200 baud, seven data bits, and no parity:

Switch #	1	2	3	4	5	6	7	8
Switch Group 1	ON	OFF	OFF	OFF	OFF	OFF	OFF	
2	ON	OFF	ON	OFF	ON	ON	ON	
3	OFF	ON	OFF	OFF	OFF	ON	ON	OFF

To select another baud rate or parity, see page 5-18 of the Franklin ACE Dual Interface Card User Reference Manual.

Cabling

Your Franklin 6-foot serial cable or other standard RS-232 cable will require a modification or extension to connect the pins listed below:

Dual Interface Card (DB-25 male plug)	Printer (DB-25 male plug)
2	2
3	3
6	6
7	7
8	8
20	19

PLUG THE DUAL INTERFACE CARD INTO SLOT 2 OF THE COMPUTER

OKIDATA MICROLINE M92, M93 (parallel printer)

Printer Switch Settings

Remove the upper cover of the Okidata printer following the directions that came with your unit. The function control switches are in the front of the machine, next to the push buttons. All eight switches should be OFF.

Dual Interface Switch Settings

Example: Without a printer or modem attached to the Dual Interface Card serial port:

Switch #	1	2	3	4	5	6	7	8
Switch Group 1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	
2	CAN	BE	SET	IN	ANY	POSITION		
3	CAN	BE	SET	IN	ANY	POSITION		

Example: With a printer or modem attached to the Dual Interface Card serial port:

Switch #	1	2	3	4	5	6	7	8
Switch Group 1	OFF	ON	OFF	OFF	OFF	OFF	OFF	
2	SEE INSTRUCTIONS FOR SERIAL DEVICE							
3	SEE INSTRUCTIONS FOR SERIAL DEVICE							

Cabling

Use a Franklin 5-foot parallel cable or other Centronics-type parallel cable.

PLUG THE DUAL INTERFACE CARD INTO SLOT 1 OF THE COMPUTER

SMITH-CORONA TP-1 (parallel printer)

Printer Switch Settings

The TP-1 contains no manual switch settings.

Dual Interface Switch Settings

Example: Without a printer or modem attached to the Dual Interface Card serial port:

Switch #	1	2	3	4	5	6	7	8
Switch Group 1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	
2	CAN BE SET IN ANY POSITION							
3	CAN BE SET IN ANY POSITION							

Example: With a printer or modem attached to the Dual Interface Card serial port:

Switch #	1	2	3	4	5	6	7	8
Switch Group 1	OFF	ON	OFF	OFF	OFF	OFF	OFF	
2	SEE INSTRUCTIONS FOR SERIAL DEVICE							
3	SEE INSTRUCTIONS FOR SERIAL DEVICE							

Cabling

Use a Franklin 5-foot parallel cable or other Centronics-type parallel cable.

PLUG THE DUAL INTERFACE CARD INTO SLOT 1 OF THE COMPUTER